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THE PROFESSIONAL GEOGRAPHER

VOLUME XII SEPTEMBER 1960 NUMBER 5

# ASSESSING DAILY MINIMUM TEMPERATURE PROBABILITIES FROM ABBREVIATED WEATHER RECORDS

*Earl E. Lackey*

*Quartermaster Research and Engineering Center*

This is one of a series of guest articles written on invitation by senior members of the geographic profession.

RECORDS OF daily minimum temperatures are stored in the files of hundreds of weather stations all over the world. For only a few of these stations have complete records of daily minima been published. However, the lowest recorded minimum is generally available, as are also the mean daily minimum and highest maximum. If these three items are available for any station, the frequency distribution of daily minimum temperatures can be reconstructed or predicted with considerable confidence by use of the nomograph herein explained.

*Construction of the nomograph.* The method assumes that the asymmetrical position of the mean daily minimum temperature between the extreme minimum and extreme maximum for a winter month at any selected station will be represented by one or more of the 30 winter months (January, March, and November) at one or more of the 10 weather stations shown by black squares in Figure 1. These stations represent a wide variety in the distribution of daily minimum temperatures in winter in North America. For each of these 10 stations a percentage frequency distribution of daily minima is available, running in general through 10 consecutive years. These are used to construct the preliminary daily minimum temperature nomograph for winter months by the following procedure.

Table I, line 1, shows the absolute minimum (AbMi) temperature, mean daily minimum (MDMi), and absolute maximum (AbMx), herein termed Essential Data, at Aklavik, Canada for January through a 10-year period. Also in line 1 for this station is given the percentage frequency of daily minima (DMi), running from −58°F. to +4°F. For example, 10 per cent of the time the daily minimum is −48°F. or lower; 90 per cent of the time, −11°F. or lower; and 99 per cent of the time, +4°F. or lower. Of course, this is the same as saying that 90 per cent of the time the daily minima are above −48° F.; 10 per cent of the time, above −11°F.; and 1 per cent of the time, above +4°F.

The reduced temperature values in line 2 are derived by subtracting the absolute minimum (−58° F.) from the values in line 1. Thus, for example, the absolute minimum becomes zero; the absolute maximum, 102; and the mean daily minimum, 30. The converted temperature values in line 3 are normalized to a 100-unit scale from the reduced temperature values in line 2. This is done by multiplying each reduced temperature by 100, and dividing the product by 102 (extreme range = AbMx−AbMi), as indicated by the formula beneath Table I. In this way, all temperatures are distributed at their appropriate positions on the 100-unit scale, with 0 for the converted absolute minimum, 100 for the converted absolute maximum, and 29

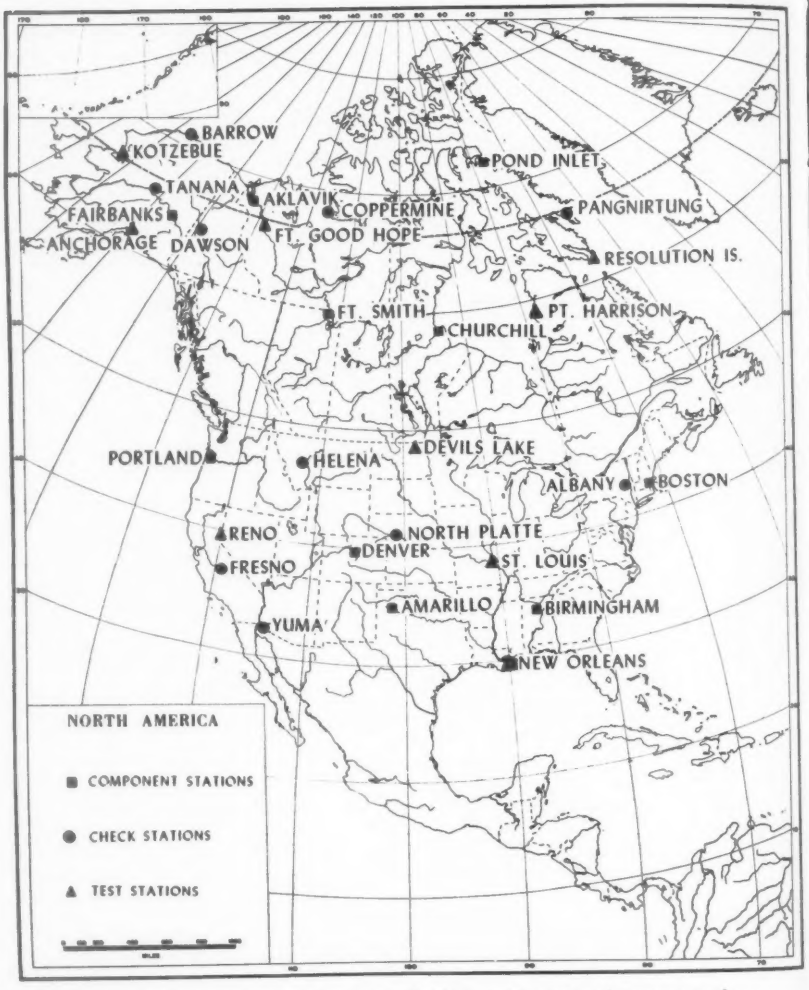


FIG. 1. Stations used in constructing, checking, and testing the nomograph.

for the converted mean daily minimum. This procedure is followed for each of the other nine stations for each of three winter months (January, March, and November).

Table II lists the 10-percentile converted daily minima for each of 30 months for each of the 10 component stations, arranged in the numerical sequence of the converted mean daily minima (CMDMi). When these paired values are plotted (black dots) on coordinate paper (Fig. 2), it is possible to draw a trial 10-percentile smooth curve of visual "best fit" (light sloping line). In a similar manner the other trial probability curves, from the 1-percentile to the 99-percentile, are drawn. Next, 10 other widely distributed stations (Table III, and the

**TABLE I**

AKLAVIK, CANADA
TEMPERATURES FOR JANUARY

| Line | Condition of Data | Essential Data Ab Mi | MD Mi | Ab Mx | Percentage Frequency of Daily Minima (DMi) 1 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 95 | 99 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Actual | −58 | −28 | 44 | −54 | −51 | −48 | −43 | −36 | −33 | −29 | −24 | −21 | −16 | −11 | −4 | +4 |
| 2 | Reduced | 0 | 30 | 102 | 4 | 7 | 10 | 15 | 20 | 25 | 29 | 34 | 37 | 42 | 47 | 54 | 62 |
| 3 | Converted | 0 | 29 | 100 | 4 | 7 | 10 | 15 | 20 | 25 | 28 | 33 | 36 | 41 | 46 | 53 | 61 |

Definitions: AbMi (Absolute Minima); MDMi (Mean Daily Minima); AbMx (Absolute Maxima).

Conversion formula: $CT = \frac{100\ RT}{AbMx - AbMi}$ CT = Converted Temperature; RT = Reduced Temperature

**TABLE II**

TEN COMPONENT STATIONS
SELECTED CONVERTED TEMPERATURE DATA

| Station | Month | CMDMi | C10% | Station | Month | CMDMi | C10% |
|---|---|---|---|---|---|---|---|
| Churchill | Jan. | 25 | 12 | Denver | Mar. | 38 | 20 |
| Pond Inlet | Mar. | 28 | 12 | Birmingham | Mar. | 39 | 18 |
| Aklavik | Jan. | 29 | 10 | Fairbanks | Nov. | 42 | 22 |
| Churchill | Mar. | 30 | 12 | Denver | Nov. | 42 | 27 |
| Portland | Mar. | 31 | 20 | Pond Inlet | Nov. | 42 | 15 |
| Amarillo | Nov. | 31 | 17 | Aklavik | Nov. | 42 | 22 |
| Birmingham | Jan. | 33 | 17 | Denver | Jan. | 44 | 27 |
| Boston | Jan. | 33 | 17 | Ft. Smith | Jan. | 45 | 19 |
| Aklavik | Mar. | 33 | 12 | Fairbanks | Mar. | 45 | 21 |
| Boston | Nov. | 33 | 22 | Birmingham | Nov. | 46 | 30 |
| Boston | Jan. | 34 | 17 | Portland | Jan. | 47 | 23 |
| Portland | Jan. | 34 | 11 | Fairbanks | Jan. | 48 | 23 |
| Amarillo | Mar. | 36 | 22 | Ft. Smith | Nov. | 48 | 27 |
| Boston | Mar. | 36 | 21 | Ft. Smith | Mar. | 49 | 23 |
| Churchill | Nov. | 36 | 12 | Portland | Nov. | 50 | 33 |

Definitions: CMDMi (Converted Mean Daily Minimum)
C10% (Converted 10-Percentile Temperatures)

**TABLE III**

TEN CHECK STATIONS
SELECTED CONVERTED TEMPERATURE DATA

| Station | Month | CMDMi | C10% | Station | Month | CMDMi | C10% |
|---|---|---|---|---|---|---|---|
| Fresno | Nov. | 21 | 10 | Dawson | Jan. | 41 | 15 |
| Pangnirtung | Jan. | 27 | 9 | Tanana | Mar. | 42 | 19 |
| Yuma | Mar. | 27 | 14 | Barrow | Jan. | 43 | 24 |
| Yuma | Jan. | 28 | 15 | Barrow | Nov. | 43 | 23 |
| Fresno | Mar. | 30 | 12 | Pangnirtung | Nov. | 43 | 23 |
| Yuma | Nov. | 31 | 17 | Albany | Jan. | 44 | 27 |
| Albany | Nov. | 31 | 16 | Coppermine | Jan. | 44 | 19 |
| Fresno | Jan. | 33 | 15 | Dawson | Mar. | 44 | 17 |
| Pangnirtung | Mar. | 34 | 15 | Albany | Mar. | 45 | 34 |
| Barrow | Mar. | 35 | 21 | Dawson | Nov. | 45 | 23 |
| No. Platte | Mar. | 36 | 20 | Tanana | Jan. | 46 | 21 |
| Helena | Jan. | 37 | 13 | Coppermine | Nov. | 46 | 18 |
| Coppermine | Mar. | 37 | 19 | Helena | Mar. | 48 | 27 |
| No. Platte | Nov. | 37 | 25 | Tanana | Nov. | 48 | 26 |
| No. Platte | Jan. | 40 | 22 | Helena | Nov. | 52 | 31 |

Definitions: CMDMi (Converted Mean Daily Minimum)
C10% (Converted 10-Percentile Temperatures)

black circles on Fig. 1) are used in the same manner to check the validity of the trial 10-percentile probability curve, and to make essential adjustments in that curve (open circles and heavy sloping line on Fig. 2). Eventually, 13 adjusted probability curves (1%, 5%, 10%, . . . etc., to 99%) are derived to indicate the visual "best fit" lines that can be drawn through each group of 60 paired values (Fig. 3). Normal prob-

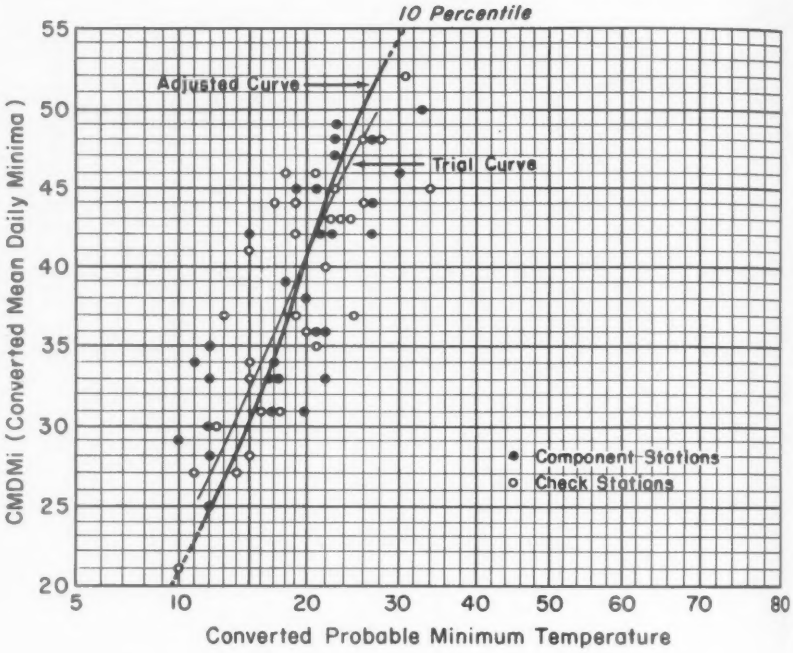


FIG. 2. "Best fit" curve for the 10-percentile probability line.

ability paper is used for convenience in plotting, because it furnishes ample room for the curves at the tail ends of the distribution.

The asymmetrical positions of the converted mean daily minima range from 21 to 52, on the 100-unit scale (Fig. 3, left margin). Since construction of the nomograph involves only 20 stations, it is desirable to extend by extrapolation the range of the converted mean daily minima somewhat beyond these limits, to 20 to 55.

*Testing the nomograph.* The nomograph as a generalized expression of normalized values, derived from actual frequency distribution of daily minima at 20 stations, should reflect quite well the actual daily minimum distribution occurring at each of those stations. Table IV shows how well the nomograph performs, at each of 13 percentile levels (1% to 99%, inclusive), for the 20 stations used in its construction. For example, 80 per cent of the time at the 1-percentile level the predicted daily minimum temperature does not differ from the actual by more than $\pm 3$ degrees F.; and 93 per cent of the time by not more than $\pm 5$ degrees F. Reliability at other percentile levels is read in the same manner.

It should be noted that the reliability of the nomograph begins to deteriorate rapidly above the 80-percentile level. This is to be expected, because the highest minimum could not be used as an element in constructing the nomograph since it is not included in abbreviated station records.

*Further validation of the nomograph.* The performance of the nomograph for some test stations (Fig. 1, black triangles), and also for other winter months (February and December), is shown in Table V. The reliability in this test parallels, approximately, that of the component and check stations.

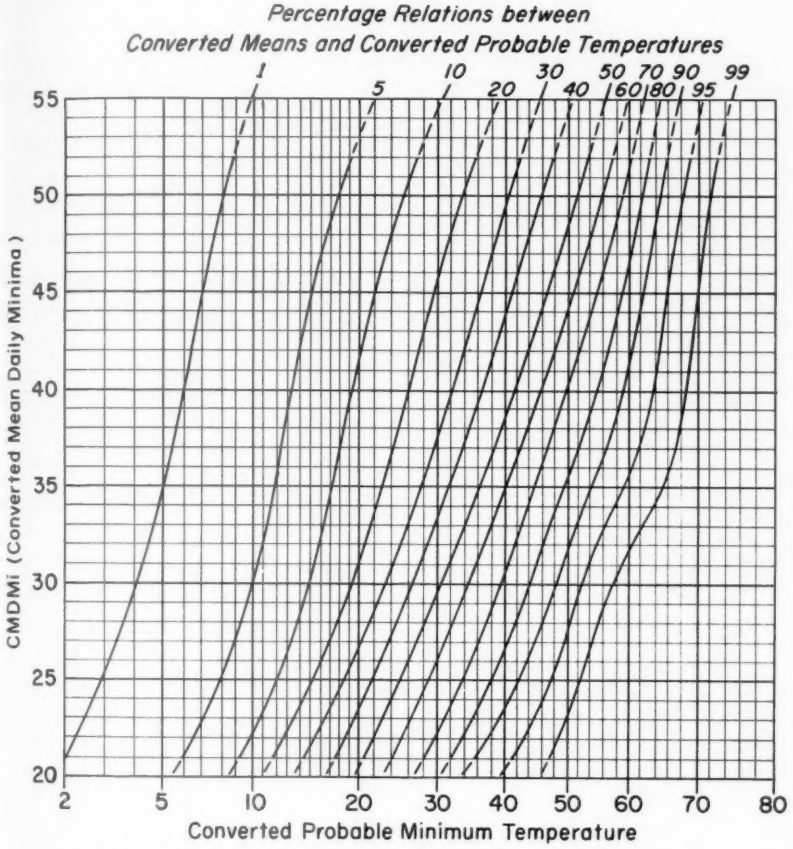


FIG. 3. Nomograph for assessing probable daily minimum temperature frequencies for winter months in North America.

TABLE IV

PERCENTAGE OF DIVERGENCE OF PROBABLE DAILY MINIMUM TEMPERATURE (F.°) FROM THE ACTUAL, AT VARIOUS PERCENTILE LEVELS OF DISTRIBUTION

| Percentile Level of Distribution | Percentage of Divergence at Eight Temperature Levels | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 0 | ±1° | ±2° | ±3° | ±4° | ±5° | ±6° | ±7° |
| 1 | 17 | 45 | 68 | 80 | 90 | 93 | 97 | |
| 5 | 13 | 40 | 57 | 70 | 80 | 87 | 95 | |
| 10 | 10 | 42 | 55 | 67 | 87 | 93 | 100 | |
| 20 | 12 | 32 | 55 | 71 | 87 | 93 | 98 | |
| 30 | 12 | 42 | 63 | 80 | 95 | 98 | 100 | |
| 40 | 17 | 48 | 72 | 88 | 98 | 100 | | |
| 50 | 23 | 58 | 73 | 78 | 92 | 100 | | |
| 60 | 12 | 42 | 70 | 78 | 93 | 97 | 98 | |
| 70 | 13 | 33 | 58 | 70 | 82 | 93 | 97 | 98 |
| 80 | 10 | 37 | 57 | 73 | 82 | 90 | 90 | 95 |
| 90 | 10 | 32 | 40 | 55 | 68 | 80 | 85 | 92 |
| 95 | 10 | 22 | 33 | 40 | 59 | 65 | 75 | 85 |
| 99 | 3 | 15 | 22 | 35 | 42 | 52 | 60 | 67 |

TABLE V

PERFORMANCE OF NOMOGRAPH

| Station | Mo. | Divergence of Actual Minimum Temperatures (F.°) from Predicted at 13 Percentile Levels 1 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 95 | 99 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alaska | | | | | | | | | | | | | | |
| Anchorage | Jan. | +1 | +3 | +2 | +3 | +1 | +2 | +1 | +2 | +1 | +1 | +2 | +1 | +1 |
| Kotzebue | Jan. | −3 | +1 | 0 | −3 | −4 | −3 | −4 | −3 | +1 | +3 | +7 | +12 | +14 |
| Tanana | Feb. | −5 | −6 | −8 | −3 | −2 | −1 | 0 | 0 | +1 | +1 | +6 | +6 | +18 |
| Canada | | | | | | | | | | | | | | |
| Ft. Good Hope | Feb. | +3 | −4 | 0 | −1 | +1 | +4 | +4 | −1 | −1 | −3 | 0 | −4 | −3 |
| Port Harrison | Dec. | −2 | −4 | −5 | −5 | −5 | −5 | −5 | −4 | −1 | +1 | +6 | +8 | +12 |
| Resolution Is. | Dec. | +2 | 0 | −1 | −2 | −1 | −3 | −3 | −2 | −3 | −3 | 0 | +2 | +3 |
| United States | | | | | | | | | | | | | | |
| Devils Lake | Mar. | −3 | −5 | −3 | −3 | 0 | 0 | +1 | +2 | +5 | +7 | +9 | +9 | +13 |
| New Orleans | Jan. | −1 | +3 | +2 | +3 | 0 | 0 | −2 | 0 | 0 | +2 | +4 | +1 | +4 |
| Reno | Jan. | −1 | −1 | −1 | −1 | −4 | −4 | −5 | −6 | −6 | −8 | −5 | −4 | −2 |
| St. Louis | Jan. | −1 | +3 | +2 | +1 | 0 | 0 | −2 | 0 | 0 | +2 | +4 | +3 | +4 |

Explanatory example: At Anchorage, in January, the actual minimum temperature at the 10-percentile level was 2 F.° above the predicted; and at the 1-percentile level was 1 F.° above the predicted.

*Nomographic values in table form.* The 13 converted temperature values associated with each of the 36 converted mean daily minima (20 to 55, inclusive) on the nomograph are entered in Table VI. For problem-solving purposes this table may be used in place of the nomograph. If the Essential Data (AbMi, MDMi, and AbMx) are available for any station, then the converted mean daily minimum (CMDMi) can be computed (Table I). Whatever this value, it is associated with a typical percentage frequency of converted minimum temperatures which are given in Table VI. The formula for computing the probable Fahrenheit temperature for any desired percentage frequency may be understood by reference to Table I.

*Machine processing.* The 36 (20 to 55,

TABLE VI

NOMOGRAPHIC VALUES IN TABLE FORM

| CMDMi | Converted Probable Minimum Temperatures at 13 Percentile Levels (1 to 99) 1 | 5 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 95 | 99 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | 2 | 5 | 9 | 11 | 13 | 17 | 20 | 23 | 26 | 30 | 34 | 39 | 46 |
| 21 | 2 | 6 | 9 | 12 | 14 | 18 | 21 | 24 | 28 | 32 | 36 | 41 | 48 |
| 22 | 2 | 6 | 10 | 13 | 15 | 19 | 22 | 25 | 30 | 34 | 36 | 43 | 49 |
| 23 | 3 | 7 | 11 | 13 | 16 | 20 | 23 | 26 | 31 | 35 | 39 | 45 | 50 |
| 24 | 3 | 7 | 11 | 14 | 17 | 21 | 24 | 28 | 32 | 37 | 41 | 46 | 51 |
| 25 | 3 | 8 | 12 | 15 | 18 | 22 | 25 | 29 | 34 | 38 | 42 | 48 | 52 |
| 26 | 3 | 8 | 12 | 16 | 19 | 23 | 26 | 30 | 35 | 39 | 44 | 48 | 53 |
| 27 | 3 | 9 | 13 | 17 | 20 | 24 | 27 | 31 | 36 | 40 | 45 | 49 | 54 |
| 28 | 4 | 9 | 14 | 18 | 21 | 25 | 28 | 32 | 37 | 42 | 46 | 50 | 55 |
| 29 | 4 | 10 | 14 | 18 | 22 | 26 | 29 | 34 | 38 | 43 | 47 | 51 | 56 |
| 30 | 4 | 10 | 15 | 19 | 23 | 26 | 30 | 35 | 39 | 44 | 48 | 52 | 57 |
| 31 | 4 | 10 | 15 | 20 | 24 | 27 | 31 | 37 | 40 | 45 | 49 | 53 | 58 |
| 32 | 4 | 11 | 16 | 21 | 25 | 28 | 32 | 37 | 42 | 46 | 50 | 55 | 60 |
| 33 | 5 | 11 | 16 | 22 | 26 | 29 | 34 | 38 | 43 | 47 | 52 | 56 | 62 |
| 34 | 5 | 11 | 17 | 22 | 27 | 31 | 35 | 39 | 44 | 48 | 53 | 58 | 64 |
| 35 | 5 | 12 | 17 | 23 | 28 | 32 | 36 | 40 | 45 | 50 | 54 | 59 | 66 |
| 36 | 5 | 12 | 17 | 24 | 29 | 33 | 37 | 42 | 46 | 51 | 55 | 61 | 67 |
| 37 | 5 | 12 | 18 | 24 | 30 | 34 | 38 | 43 | 47 | 52 | 56 | 62 | 67 |
| 38 | 6 | 13 | 18 | 25 | 31 | 35 | 40 | 44 | 48 | 53 | 57 | 63 | 68 |
| 39 | 6 | 13 | 19 | 26 | 32 | 36 | 41 | 45 | 49 | 54 | 58 | 63 | 68 |
| 40 | 6 | 13 | 19 | 26 | 32 | 37 | 42 | 46 | 50 | 55 | 59 | 64 | 69 |
| 41 | 6 | 14 | 20 | 27 | 33 | 38 | 43 | 47 | 51 | 56 | 60 | 64 | 69 |
| 42 | 6 | 14 | 20 | 28 | 33 | 39 | 44 | 48 | 52 | 56 | 60 | 65 | 69 |
| 43 | 7 | 14 | 21 | 28 | 34 | 40 | 45 | 49 | 54 | 57 | 61 | 65 | 70 |
| 44 | 7 | 15 | 21 | 29 | 35 | 40 | 46 | 50 | 55 | 58 | 62 | 66 | 70 |
| 45 | 7 | 15 | 22 | 29 | 36 | 41 | 47 | 51 | 56 | 59 | 62 | 66 | 70 |
| 46 | 7 | 15 | 22 | 30 | 37 | 42 | 48 | 52 | 56 | 60 | 63 | 66 | 70 |
| 47 | 7 | 16 | 23 | 31 | 38 | 43 | 49 | 53 | 57 | 60 | 63 | 67 | 71 |
| 48 | 8 | 17 | 24 | 32 | 39 | 44 | 50 | 54 | 58 | 61 | 64 | 67 | 71 |
| 49 | 8 | 17 | 24 | 33 | 40 | 45 | 51 | 55 | 58 | 62 | 64 | 68 | 72 |
| 50 | 8 | 18 | 25 | 34 | 40 | 46 | 52 | 56 | 59 | 62 | 65 | 68 | 72 |
| 51 | 8 | 18 | 26 | 35 | 42 | 47 | 52 | 57 | 60 | 63 | 65 | 69 | 73 |
| 52 | 9 | 19 | 27 | 36 | 43 | 48 | 53 | 58 | 61 | 63 | 66 | 69 | 73 |
| 53 | 9 | 20 | 28 | 37 | 44 | 49 | 54 | 58 | 61 | 64 | 66 | 70 | 74 |
| 54 | 10 | 21 | 29 | 38 | 45 | 50 | 55 | 59 | 62 | 64 | 67 | 70 | 74 |
| 55 | 10 | 22 | 30 | 39 | 46 | 51 | 56 | 60 | 63 | 65 | 68 | 71 | 75 |

inclusive) converted mean daily minima in Table VI may be entered on separate punch cards, each with its 13 associated percentile converted temperature probabilities. If a card, with the three items of Essential Data for a winter month at any weather station punched on it, is placed in the computing machine with the above card deck, the machine will do the necessary sorting and computing and furnish the 13 percentile temperatures (Fahrenheit) that may be expected for that station.

Of course, if this is done for an area with a network of weather stations, then a series of percentile daily minimum probability maps can be drawn. Such maps could be useful in assessing calculated risks where daily minimum temperatures must be taken into account, as in the production of frost-sensitive crops, the winter transportation of fruits and vegetables, and the operation of sensitive machinery.

*Some factors limiting use of the method.* If either tail of a record is exceptionally extreme, it severely modifies the extreme range and consequently the asymmetrical position in the distribution of the converted mean daily minimum. Each of the converted temperature frequencies likewise could be somewhat displaced.

Extending the period of observation might include variables that recur infrequently. However, this study must leave such variables in the realm of uncalculated risk.

## GEOGRAPHY AND HISTORY CROSS-CLASSIFIED

*John K. Wright**

*Lyme, N.H.*

This is one of a series of guest articles written on invitation by senior members of the geographic profession.

IN 1955 THE author suggested various ways of classifying and cross-classifying geographical quantities. *(1)* Here he will explain how a similar technique may be used with reference to the confusing, and largely semantic, problem of the relations between geography and history. *(2)* The table and explanatory materials that follow are not intended to prove or disprove anything, but simply to chart roughly a large range of possible relationships, to give a few examples, and to incite the reader to think of better examples of his own. It may also be noted that, by changing the symbols, one could use the same scheme for classifying the relationships between any two fields, as, for example, geography and law, theology and geology, or metaphysics and regional science.

In the accompanying table, *G* and *H* stand generally for geographical and historical study, respectively, in a very broad sense of those terms, i.e., for geography and history considered not only as bodies of knowledge and belief, true or false, scientific or unscientific, but also as fields of learning or disciplines or professions. *G* and *H* likewise represent geographers and historians, and, indeed, anything and everything directly concerned with the acquisition, discussion, exposition, and dissemination of geographical or historical knowledge. In contrast, *g* and *h* stand, respectively, for the objective realities that *G* and *H* record, describe, explain, and interpret. The terms history, historical, and historic, as here treated, are restricted rather arbitrarily to human events and conditions in the past. The reader may suit himself as to the meaning of geography, geographical, and geographic. Whereas the word historical is frequently used with respect to both *H* and *h*, historic is ordinarily applied only to *h* (we say an historic house but not an historic society, except in the case of one that is actually old). The terms geographical and geographic ordinarily would seem to be used interchangeably, e.g., American Geographical Society, National Geographic Society. In this paper, however, the words geographic and historic are con-

sistently used with reference only to *g* and *h*, respectively, except in the use of the terms historical geography and geographical history for historic geography and geographic history.

The pairs of letters in the table represent 16 main categories of relationship. Thus, *GG* might imply, among other things, relations between two kinds of geographical study, e.g., political and urban geography; *GH* might imply relations between geography and historiography; *hg*, relations between the actual course of history and the actual spread of geography; and so forth.

Furthermore, each pair of letters may be punctuated as follows, to distinguish between two other very important species of relationship, i.e., those of influence and those of mere concern: (1) with a /, to indicate that the first item in the pair influences the second, e.g., *G/H* represents geographical study conceived as influencing historical study; (2) with ( ), to indicate merely that the first item is concerned with, or has to do with, the second on the basis of a relationship that usually can be indicated by the preposition "of," e.g., *G(h)* represents geographical study of the course of history. Other relationships may also be suggested by combinations of three letters, thus: *G(g/h)*, meaning the geographical study of the influence of actual geographic circumstances upon the course of history.

Inasmuch as they do not suggest relationships between geography and history, the eight bracketed items in the table will be disregarded here, although it is not uninteresting to speculate on what they might imply. *G(G)*, for example, might signify the study of geographical knowledge from the geographical point of view, which is an aspect of what the author called geosophy in 1947. *(3)*

Interpretations of each of the eight unbracketed pairs of letters in the table follow, first on the basis of one factor in a pair influencing the other, and second on the basis of one factor in a pair being concerned with, or having to do with, the other.

### RELATIONSHIPS INVOLVING INFLUENCE

*G/H.* The influence of geographical study upon historical study. Example: the inspiration for his frontier hypothesis derived by Frederick Jackson Turner from United States census maps.

TABLE

| | | | GEOGRAPHICAL HISTORICAL STUDY | | GEOGRAPHIC HISTORIC REALITY | |
|---|---|---|---|---|---|---|
| | | | *G* | *H* | *g* | *h* |
| GEOGRAPHICAL | STUDY | *G* | [*GG*] | *GH* | [*Gg*] | *Gh* |
| HISTORICAL | | *H* | *HG* | [*HH*] | *Hg* | [*Hh*] |
| GEOGRAPHIC | REALITY | *g* | [*gG*] | *gH* | [*gg*] | *gh* |
| HISTORIC | | *h* | *hG* | [*hH*] | *hg* | [*hh*] |

*G/h.* The influence of geographical study upon historic reality. Examples: the impact of Hakluyt's geographical works upon the expansion of England in the age of Elizabeth I; the effect of the work of geographers at the Paris Peace Conference, 1919-20, upon the drawing of the boundaries of the Central European states and consequent political troubles.

*H/G.* The influence of historical study upon geographical study. Example: a course in historical bibliography under Professor C. H. Haskins, which inspired the preparation of a geographical bibliography, the first edition of *Aids to Geographical Research.*

*H/g.* The influence of historical study upon geographic reality; i.e., geographical historiography (see also *H(g)*, below). Example: the effect of the work of the historians at the Paris Peace Conference toward bringing about a new order of political geography as reality.

*g/H.* The influence of geographic reality upon historical study; i.e., historiographical geography (see also *G(H)*, below). Example: the influence of the geographic environment upon the writing of history, and the distribution and nature of historical societies.

*g/h.* The influence of geographic reality upon historic reality, i.e., environmental determinism as reality (see also *H(g)*, below). Example: the effects of floods and droughts upon the course of history.

*h/G.* The influence of historic reality upon geographical study. Examples: the rise of Geopolitik as a result of frustration of nationalistic aspirations; Sauer's hypothesis that Midwestern historical circumstances explain certain distinctive characteristics of Midwestern geography (*Annals of the Association of American Geographers*, Vol. XXXI, 1941, p. 3).

*h/g.* The influence of historic reality upon geographic reality (see also *H(g)*, below). Examples: man's role in changing the face of the earth, as studied by G. P. Marsh and others; the effects of Sherman's march upon the physical, biological, and cultural geography of Georgia.

### RELATIONSHIPS INVOLVING CONCERN

*G(h).* The geographical study of historic torical study; i.e., the geography of historiography, or historiographical geography (see also *g/H*, above). Example: a study of the geographic distribution of historians.

*G(h).* The geographical study of historic reality (see also *g(h)*, below, and footnote 2). This relationship involves either (a), history *in* geography, i.e., the use of historical material in the study and teaching of geography, or (b), historical geography, in which the course of history is the subject of investigation from the geographical point of view, as, for example, in R. H. Brown's *Historical Geography of the United States* or in any historical atlas.

*H(G).* The historical study of geographical study. This relationship is usually known as the history of geography, since there is no term for the study of geography comparable to historiography for the study of history. It deals with the development of geographical knowledge and related enterprises.

*H(g).* The historical study of geographic reality. This relationship involves either (a), geography *in* history, i.e., the use of geographical material in the study and teaching of history, or (b), geographical history, in which geographic circumstances are considered from an historical point of view. No sharp line can be drawn between *H(g)*, geographical history, and *G(h)*, historical geography, above. The term geographical history would seem usually to be applied to *H(g/h)*, i.e., historical studies such as H. T. Buckle's *History of Civilization in England* or Ellen C. Semple's *American History and its Geographical Conditions*, both of which seek to explain history in terms of geographical influences. Semple's *Influences of Geographical Environment*, however, might better be classed as *G(g/h)*, since it is primarily a geographical study of environmental influences upon the course of history. (See also *h/g*, above.)

*g(H).* The geographic reality of (actual geography of) historical study; i.e., historiographical geography as reality (see *G(H)*, above).

*g(h).* The geographic reality of (actual geography of) historic reality; i.e., historical geography as reality (see *G(h)*, above).

*h(G).* The historic reality of geographical study; i.e., the history of geography as reality; the actual development of geographical study, as distinguished from *H(G)*, the study of that development.

*h(g).* The historic reality of geographic reality; i.e., geographical history as it actually transpired on the face of the earth (see *H(g)*, above).

* * *

(*) Formerly Director, American Geographical Society of New York, now retired.

(1) Wright, J.K., "'Crossbreeding' Geographical Quantities," *The Geographical Review*, Vol. XLV, No. 1, January, 1955, pp. 52-65.

(2) See Clark, A.H., "Historical Geography," in *American Geography: Inventory and Prospects,* James, P.E. and Jones, C.F., eds., Syracuse University Press, 1954, pp. 70-105; Hartshorne, R., *Perspective on the Nature of Geography,* Rand McNally and Co., 1959, pp. 101-107.

(3) Wright, J.K., "Terrae Incognitae: The Place of the Imagination in Geography," *Annals of the Association of American Geographers,* Vol. XXXVII, No. 1, March, 1947, pp. 1-15; see also "Communication," *ibid.,* Vol. XXXIX, No. 1, March, 1949, p. 47.

# AN ARITHMETIC METHOD FOR DETERMINING ELEVATION CHANGES ON AERIAL PHOTOGRAPHS

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GEOGRAPHERS have been using stereoscopic aerial photographs as a basic research tool for more than 35 years. During this time, the photograph functioned mainly as a quantitative device in analyzing the character of an area in terms of countable items, definable areas, or specialized surveys. Stereoscopic measurement of height phenomena was largely ignored in such studies, and classifications based on length and width criteria provided the basic units of measurement.

The geographic usefulness of stereoscopic aerial photographs is considerably enhanced if the usual measurements of length and width can be augmented by measurement of vertical dimensions. It is the purpose of this paper to present a relatively simple arithmetic basis for determining such vertical dimensions from aerial photos. The advantage of an arithmetic method not requiring expensive photogrammetric equipment will be appreciated by research workers, photo interpreters, and teachers of aerial photography. The method is presented here for those geographers already acquainted with the general principles of aerial photography. The usefulness of the method will depend in part on the degree of significance which geographers attach to the vertical characteristic of the earth phenomena under study.

To cite a specific example, let us assume that a certain project is designed to survey a county area and that water towers in that county must be classified according to a code which emphasizes differences in height of the various towers. This survey may be achieved with the following materials: air photos of the area in question, pocket stereoscope, engineer scale, grease pencil, and straight pin.

Once the scale of photography (S) and focal length of camera (f) have been determined, the flight altitude (H) of the aircraft may be calculated according to the following equation:

$$H = \frac{f}{S} \qquad \text{(Equation 1)}$$

Most available commercial and government photography has been obtained with cameras using a 6-inch focal length lens. Longer or shorter focal length is usually printed in the margin of the individual photo. This measurement should be converted to decimal portions of a foot for ease in deriving a flight altitude (H) in feet.

Baselining, the next step in this method, is accomplished by transferring the principal (center) point of one photo to its corresponding position on the adjoining photograph. The line connecting the principal point of the photo with the "transferred" principal point of the adjoining photograph is known as the baseline. Both of the overlapping photos must be baselined in this

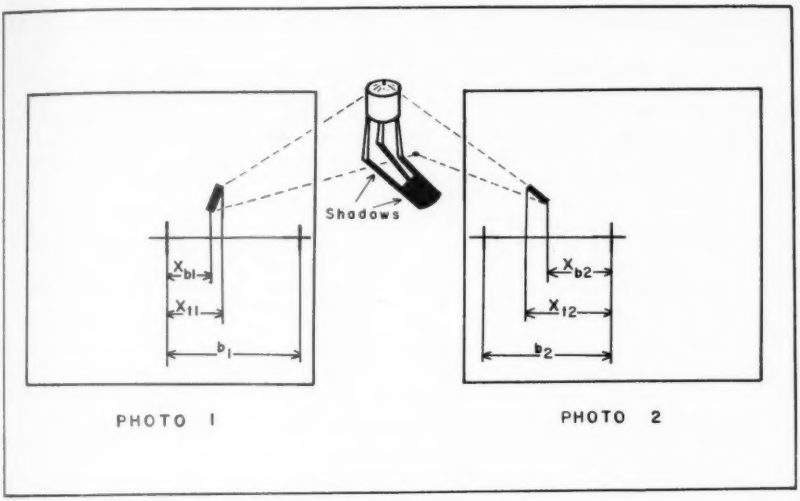


FIG. 1

manner (Fig. 1, distances $b_1$ and $b_2$). Principal points must be accurately transferred from one photo to the next and the use of a pocket stereoscope is recommended in matching up detail.

Selection of good photo identities, one at the base of the tower and the other at the top (Fig. 1), is a subjective matter of critical importance. Special care should be exercised in pin-pointing the two identities on both photographs. In Figure 1, the apex of the tower and a black spot on the ground near the base were selected because each identity was clearly discernible on both photographs. It should be noted that elevation changes may be computed between any two selected points lying in different horizontal planes; e.g., the elevation of a hill may be computed on the basis of the elevation change of identities found at the top and bottom of the hill, even though the two points are linearly separated from each other. The height equation, below, will give the elevation change between two photo identities, but only if the two identities are clearly indicated and accurately pinpricked on both photos.

The displacement value of the watertower (d), or the relative change of the two-point image on two successive photographs, must now be determined. Accurate measurement of the watertower extremities (top and bottom photo identities) is obtained as a distance measured along the baselines of both photographs. Measurements must be carried to the nearest .01 inch with the aid of an engineer scale. In Figure 1, this procedure is diagrammed so that the displacement value (d), or the relative change in position for the two-point image, is equal to the sum of the coordinates to the top of the image ($X_{t1} + X_{t2}$) minus the sum of the coordinates to the bottom of the image ($X_{b1} + X_{b2}$).

The values for the indicated measurements may then be substituted in the height formula below:

$$h = \frac{H}{b + d} \cdot d \quad \text{(Equation 2)}$$

where h is the height of the water tower, H is the flight altitude, d is the value ($X_{b1} + X_{b2}$) subtracted from ($X_{t1} + X_{t2}$), and b is the average length of the photo air bases

$$\left(\frac{b_1 + b_2}{2}\right).$$

All measurements should be converted to decimal portions of a foot to facilitate ease of computation. A simple check of the accuracy of the height measurement (h) may

be obtained by solving for H in the derivative formula:

$$H = \frac{h(b-d)}{d} \quad \text{(Equation 3)}$$

If the flight altitude (H), as determined here, results in a value within 0.10% of the original flight altitude derived in Equation 1, is may be assumed that the vertical measurement is also accurate to within 10% of its true value. This degree of accuracy represents the maximum error allowable with photography of a scale of 1:20,000. Due care in pin-picking points and conducting measurements will reduce the margin of error.

The height determination equation (Equation 2), as described above, may be used in measuring other earth phenomena having a significant and measurable change in the vertical dimension. Conceivably, measurements of maturing crops, terrain features, and urban structures could be inventoried and classified. However, certain image relations and other required information concerning the characteristics of the photography must first be established if parallactic computations are to apply.

# CULTURAL ANIMAL GEOGRAPHY: AN INVITING FIELD OF RESEARCH

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THE PURPOSES of this paper are twofold: (1) to focus the attention of geographers upon the long standing paucity of zoogeographical work by members of the profession, and (2) to suggest areas of zoogeographic research in which geographers can make significant contributions.

Although animal geography has long been recognized by geographers as being an essential facet of their discipline, research on various aspects of the field has been left almost entirely to zoologists. Indeed, it must be admitted that, even at the textbook level, treatment of animal geography by geographers is lamentably inadequate and the subject is customarily presented in a fashion which would not be acceptable in text portions dealing with landforms or climate. There appear to be at least two important reasons for the present unhappy condition of zoogeography. First, it is believed by many geographers that only zoologists possess adequate training to do research in, or publish on, animal geography. Of greater importance, however, is the fact that the umbilicus of geography, particularly in the United States, was firmly attached to the womb of the physical sciences, and thus the accident of conception has tended to foster a rather meager appreciation of zoological phenomena.

In truth, there is justification for deferring to zoologists certain facets of the broad study of animal geography. The field was first cultivated by zoologists and, over the past century, concepts and nomenclature have grown in number and complexity to such a degree that the geographer has been disinclined to enter this arena of investigation. On the other hand, we should not accept the weight of long custom as justification for continued avoidance of animal geography, nor should semantic problems lead one to believe that participation in the field demands more than geographers are qualified to give.

Before more is said in regard to the role of animal geography in the research of geographers, it is important that a brief review be made of those aspects of the subject which presently represent the foci of research effort. These foci are three in number: faunistic, historical, and ecological. The faunistic approach is chiefly concerned with ascertaining areal distributions of ani-

mal species. Such studies may be confined to a single subspecies having a very small range, or they may encompass the fauna of entire continents. This aspect of animal geography is the oldest of the three approaches but is somewhat limited in its usefulness. Historical animal geography chiefly involves an analysis of geological and fossil evidence in order to formulate a picture of animal distributions in the past, and thus to make more comprehensible some of the reasons for present faunal distribution. Ecological animal geography employs to a large extent investigative methods of the ecologist in an attempt to understand some of the environmental dynamics which presently and through past time have influenced the distribution of animal populations. It must be emphasized that the several approaches are usually not distinct in practice, and that most zoogeographic studies include elements of all three.

The author wishes here to propose a fourth approach to the study of animal geography, an approach that is certain to be a rewarding area of research for geographers even though they are equipped with only a modest background in the biological sciences. The proposed field could well be termed *cultural* animal geography, for it would encompass those aspects of animal geography which accumulate, analyze, and systematize data relevant to the interactions of animals and human cultures. Man has been interacting with other animal species since his earliest beginnings. In the role of ecological dominant, man has exerted great influence upon animal life in terms of their numbers and distributions. Man has deliberately or accidentally transported animals across zoogeographical barriers; destroyed huge segments of faunas to provide food, raw materials, or *lebensraum* for his own species; domesticated a long list of animals; and used fur, fish, game meat, ivory, and similar items as stepping stones to conquest. On the other hand, human ecological dominance often has been challenged by animals which have destroyed man's crops or, by carrying or causing disease, have caused whole human populations to live out a sick and lethargic existence.

Avenues of possible research in cultural animal geography are many. Two suggested examples should serve to illustrate the possibilities.

The first involves investigating the role of man through time as an accidental or deliberate agent in dispersal of animal species other than his own. Some recent research by zoologists indicates that man has long been a potent modifying factor in animal distribution, but our present knowledge of these phenomena is limited. Philip Darlington recently alluded to the long history of human interference with animal distribution, and indicated that a critical study of redistribution would be an "important contribution to biogeography."*(1)* Geographers in recent years are becoming increasingly aware of the significance of human activities in modifying the surface of the earth, as a recent symposium volume testifies.*(2)* However, as the content of this volume further indicates, there is presently lacking in the geographic fraternity an appreciation of the degree to which man has influenced and continues to influence the numbers and distributions of other animal species.

The second general research topic here suggested is an investigation of present day subsistence hunting and fishing. If one were to rely only upon published information for an evaluation of these activities, one might reasonably conclude that the phenomena are of little significance in contemporary cultures. Such a conclusion would be incorrect for, in truth, we are confronted with a vast portion of the earth's surface, situated mostly between the Tropics of Cancer and Capricorn, in which the statistically modest but dietetically and ecologically significant activities of subsistence hunting and fishing are carried on extensively in conjunction with other economic pursuits. However, we know very little about species and quantities of animals taken. We know too little about the dietary importance of such foods in terms of protein intake. Our knowledge is meager on ecological ramifications of these activities, and thus we lack basic data upon which sound conservation programs can be based. Surely this is a segment of animal geography research in which geographers can make important contributions.

In conclusion, the author wishes to suggest that a vigorous tilling of the field of cultural animal geography, by geographers, will result in significant extension of zoogeographical knowledge. More importantly, such research will bring animal geography

back into the geographic fold, and thus impart to geographers and their students a needed appreciation of the importance of animals as an element in the landscape as well as an awareness that man is himself an animal and is intimately involved with the whole panoply of biological phenomena.

* * *

(1) Darlington, Philip J., Jr., *Zoogeography: The Geographical Distribution of Animals*, John Wiley & Sons, New York, 1957.

(2) Thomas, William L., Jr., ed., *Man's Role in Changing the Face of the Earth*, University of Chicago Press, Chicago, 1956.

# GREAT CIRCLES AND THE GNOMONIC PROJECTION

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*Northwestern University*

MAPS AND MAP projections frequently receive consideration in introductory courses in physical geography. Textbooks used in such courses provide beginning students with examples of the more common map projections. By examination and comparison of different projections, the individual becomes cognizant of variations in area, shape, distance, and direction. To help achieve this end, properties of each projection are indicated and their advantages and disadvantages are enumerated.

The gnomonic projection, because of its unique characteristic of representing all arcs of great circles as straight lines, often is included in the discussion. Unfortunately, however, an explanation of this property usually is omitted. As a result, the inquiring student not infrequently will seek an explanation from his instructor. A satisfactory technique for teaching this particular characteristic is, therefore, of pedagogic interest to instructors of college geography.

The authors have found that the following method explains the unique property of the gnomonic projection in a manner that can be understood by the interested scholar. Prerequisite to this method is the student's comprehension of four basic concepts.

Concept 1: A great circle can be formed only by the intersection of the spherical surface of the earth with an imaginary plane passing through the center of the earth. There is, obviously, an infinite number of planes that can bisect the earth. One possible position of the bisecting plane is shown in Figure 1. This plane passes through the center of the earth and forms an arc of a great circle, x–y, where it intersects the earth's surface.

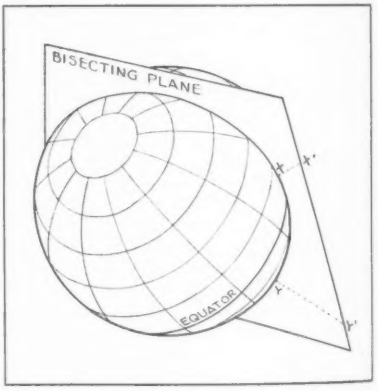


FIG. 1

Concept 2: A second basic concept to be acknowledged is that light travels in a straight line. If this were not true it would be useless to aim a gun.

Concept 3: The gnomonic projection is constructed on a plane surface. While it is

true that map projections are generally computed mathematically, there are a number of projections that can be understood more readily by thinking of them as being "shadow cast." In this method a light is used to cast or project the grid of a globe upon some developable surface, i.e., a cylinder, cone, or plane. In the case of the gnomonic, the source of light is at the center of the globe and the grid is projected upon a plane tangent to the surface of the globe. Figure 2 illustrates a situation in which a plane is tangent at 20°N. By means of the imaginary light in the center of the globe a portion of the spherical grid is projected upon the tangent plane. The resulting arrangement of parallels and meridians on the tangent plane, or plane of projection,

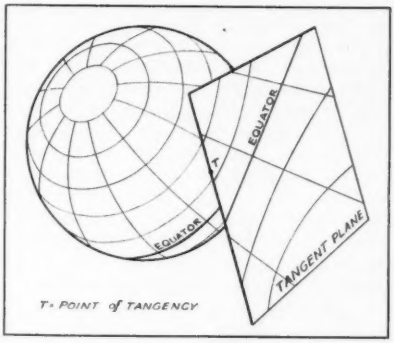


FIG. 2

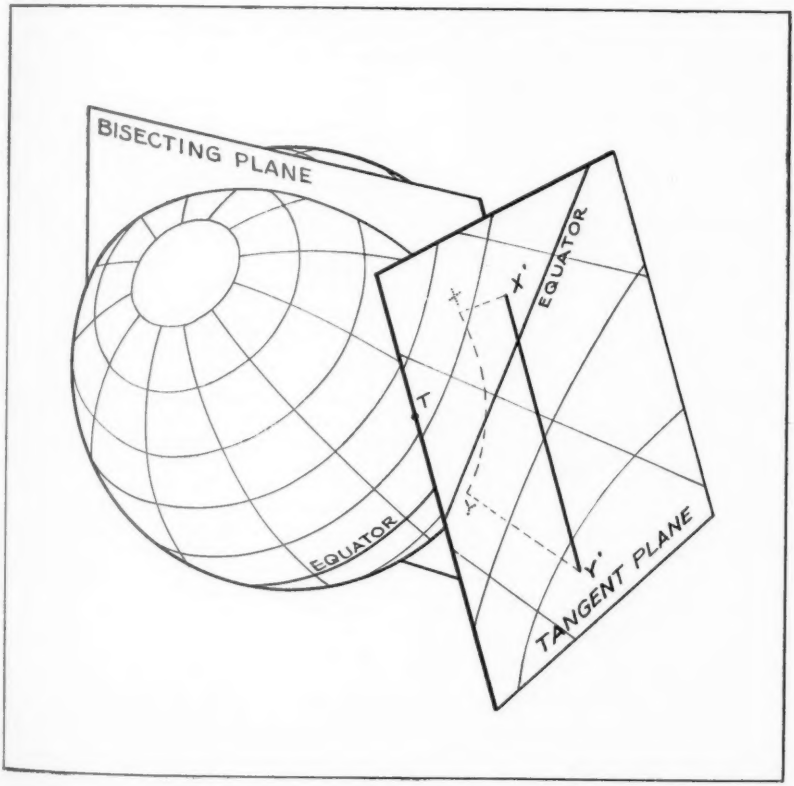


FIG. 3

is a gnomomic projection of the oblique case.

Concept 4: The intersection of any two planes is a straight line. For example, the junction of a wall and ceiling produces a straight line common to both planes. Moreover, no matter at what angle a carpenter's saw might cut off the corner of a wooden block, straight lines would mark the intersection of the plane of the saw and the sides of the block. Thus, it can be seen that, regardless of the angle of intersection of planes, a straight line always results.

Figure 3 combines the concepts contained in Figures 1 and 2 to illustrate schematically why great circle routes are straight lines on the gnomonic projection. The great circle route, x–y, lies in the bisecting plane as do imaginary light rays from the center of the globe. Any projection of the curved intersection, x–y, will remain in the plane of bisection since projection can only be in a straight line. The intersection of the bisecting plane and the tangent plane, as is true of all intersecting planes, will be a straight line. Thus, it is evident that the great circle route, x–y, on the surface of the globe will appear as a straight line, x′–y′, on the gnomonic projection.

Only the gnomonic projection possesses this particular characteristic because it alone fulfills two required conditions. The first condition is that the plane formed by the source of light and any two points on the earth's surface must bisect the earth. Only when the light source is at the center of the earth is this condition always satisfied. The second essential condition is that the earth's grid be projected upon a plane. If, on the other hand, the earth's grid is projected upon a cone or a cylinder the resulting intersection of the bisecting plane and the surface upon which the grid is projected will be, in most instances, a curved line. Only for limited cases will a conic or cylindrical surface produce a straight-line intersection, whereas such an intersection invariably results when a plane surface is used.

## VISUAL AID PROCEDURES FOR OUR NATIONAL MEETINGS

*Malcolm A. Murray*

*Miami University*

IT HAS BECOME increasingly evident in recent years that definite but flexible procedures should be established with respect to visual aid programming at national meetings of the Association of American Geographers. Each year more individuals present papers and the majority of them require visual aid assistance of some sort. The purpose of this article is two-fold. First, it is hoped that future visual aid committees will benefit from the experiences of previous ones. Second, members of the Association, who may be presenting papers in the future, should be aware of the problems that face visual aid committees.

The success of the visual aid program depends upon several factors. One of these is the organization of the visual aid committee itself. A second is the availability of adequate equipment in good working order. A third is timing in the scheduling of session rooms. Finally, the cooperation of individuals presenting papers is absolutely essential. Let us consider each of these factors.

*Visual aid committee.* The chairman of the committee must establish the procedure. The following is a suggested procedure which might be used.

At least six months prior to the meetings, information should be published in *The Professional Geographer* with respect to size of the meeting rooms. Repeat this information in the following issue. Unfortunately, not all members of the Association read every issue of *The Professional Geographer* and some apparently do not read it at all. However, the notices should reach

a majority of the members and should provide those planning papers with a rough idea of what to expect.

After the program chairman has completed the program, visual aid information should be mailed to each speaker. This should include specific data with respect to the size of the rooms, distance of projectors from screens, and focal length and wattage of projectors. Each speaker should be instructed to confine himself to one size of slide if possible (either 2" x 2" or 3" x 4"). If more than one size of slide must be used, mixing of slides should not be allowed except under unusual circumstances; rather, the paper should be arranged so that different sized slides can be shown consecutively. Insist that extra slides be made for those to be repeated. Specific instructions about tabbing and numbering slides should also be included. Slides should be in proper containers. Instruct speakers to submit their slides, with an accompanying marked paper, to the visual aid headquarters at least 12 hours before the paper is to be presented. One reason for the 12-hour requirement is to allow the visual aid committee time to check slides for proper tabbing and numbering. Encourage speakers to try out their slides before they come to the meetings.

A questionnaire should accompany this information. Data the visual aid committee must have include size of slides to be used, number of slides, and whether or not the speaker will need special materials such as wall maps or facilities for posting charts and graphs. As each questionnaire is returned, record the information by name of speaker on an index card. During the meetings, these cards will prove invaluable in planning visual aid needs at each session. To assure a more complete return of questionnaires, include a stamped and addressed return envelope. Second notices will have to be sent to some speakers, but with luck some 90 per cent of the speakers will eventually return them and certainly all of those will who are interested in proper illustration of their paper. Insist on the return of the questionnaires even if no visual aids are required.

The visual aid committee should provide at least two projectionists for each session. The projectionists should have been subjected to an orientation program so that they will be able to handle screens, projectors, and other equipment with facility. Prior to the meetings, the projectionists should be provided with a schedule of their responsibilities so that they will have no doubts as to the place and time that their services are required. The visual aid chairman should not plan to do projecting since he will be kept busy planning sessions, checking on sessions in progress, and receiving slides from speakers scheduled for forthcoming sessions. He should provide himself with an able assistant. For a three parallel session meeting, a minimum visual aid committee should consist of eight people. At the meetings the committee should be provided with a room for its exclusive use.

*Equipment.* Any standard projection equipment will suffice but there are several things that should be checked. Most 3" x 4" projectors have a standard carry-through slide carriage that loads from both sides. This type of carriage usually presents no problems. However, many modern 2" x 2" projectors have carriers which load only from the right side and eject the slide on the left side. This type of carrier is not to be trusted since it tends to jam when subjected to both glass-mounted and cardboard-mounted slides. If at all possible, use projectors with a carry-through slide carriage. Usually, 500-watt projectors will suffice unless the window drapes are not sufficient to cut off outside light. Screens should be of the largest size possible, at least 7' x 7'. For a three parallel session meeting the basic projection equipment should include four 2" x 2" projectors, four 3" x 4" projectors, and four large screens. The extra projectors and screen are for emergencies. In addition, the visual aid committee should be responsible for providing each room with an electric signalling device for slide changes, a flash pointer, and a stick pointer. Other necessary equipment includes easles and blackboards (hotels can usually provide these), requested wall maps, and celotex board for tacking maps and charts. Standard size portable screens provide an excellent medium for hanging wall maps. Hotels usually provide suitable lecterns. The committee should be well supplied with tabs for slides, containers for 2" x 2" and 3" x 4" slides, masking tape, Scotch tape, scissors, cord, rubber bands,

three-way plugs, extension cords, and pen flashlights (for projectionists).

*Scheduling of rooms.* If possible, the local arrangements committee should contract for session rooms which are for exclusive use of the AAG throughout the convention. Under these conditions, visual aid equipment can be left set up. If this is not possible, be sure that meeting rooms are cleared at least three-quarters of an hour before sessions are scheduled to start. This amount of time is required to properly set up the rooms.

*Speaker cooperation.* Probably the biggest problem in connection with visual aid programming is soliciting cooperation of speakers. Usually poor cooperation is not due to maliciousness, but rather to lack of understanding of the problems involved. Some requests made by speakers seem rather weird, and yet they are usually reasonable from the speaker's point of view. If known in advance, the visual aid committee can generally take care of such requests. Unfortunately, it is often the speakers with peculiar requests who fail to return their questionnaires.

We must remember that visual aid committees usually operate with volunteer personnel who are not professional projectionists. This is one more reason why procedures must not only be organized but must be kept as simple and unencumbered by peculiar requests as possible. Such organization is not for the sake of convenience of the visual aid committee but rather to ensure best results for the speakers concerned.

## THE STAR OF THE AAG

*William D. Pattison*

*University of California at Los Angeles*

THE INSIGNIA of the Association of American Geographers, designed by W.L.G. Joerg and adopted in 1911, the year of the first annual meeting of the Association, consists principally of a five-point star projection of the world. Removed from the complete insignia, it looks like this *(1)*:

The purpose of this note is to bring the history and nature of the projection to the attention of members of the Association, the persons who are, after all, officially represented by it.

At the time of the star's adoption there were four important geographical societies in the United States, the American Geographical Society of New York, the Geographic Society of Chicago, the Geographical Society of Philadelphia, and the National Geographic Society, from all of whose seal designs the star-form comprised a distinct departure. Choice of this form, however, aligned the AAG emblem with a very ancient tradition of star-symbolism; and inscribing the star in a circle associated the emblem, probably unintentionally, with a famous drawing by Leonardo da Vinci, "Proportions of the Human Figure after Vitruvius." Should this suggested association seem forced, the reader is referred to two recent illustrations which incorporate star-form and world-map into derivatives of da Vinci's man and circle, the cover designs of Julian Huxley's *Man in the Modern World* (Mentor, 1948) and Ellsworth Huntington's *Mainsprings of Civilization* (Mentor, 1959).

As a projection, the AAG's star has these identifying characteristics: the northern hemisphere appears whole, within a circle, being the polar case of the azimuthal equidistant projection, and the southern hemisphere takes the form of five appendages

based upon as many symmetrically radiating central meridians. While elements of this pattern are centuries old, in exactly this combination they are attributed by all accounts to a map of 1879 by Herman Berghaus, geographer and cartographer of the Geographical Institute of Justus Perthes, Gotha. In America, a school book editor and author, Russell Hinman, became greatly attached to Berghaus' star, learning of it perhaps through Stieler's *Hand-Atlas* of 1880. In Hinman's *Eclectic Physical Geography* (1888), the star emerged as the principal world projection, and it received attention in a special note by the author. Hinman's continued use of the star may not have led to its selection by Joerg, since Joerg as a student at the University of Gottingen was in constant touch with German sources during the years before 1911; but one's inclination to believe in Hinman's influence increases when it is realized that his way of rotating the limbs of the star was, of all possible ways, precisely the one chosen by Joerg, and that this position differed perceptibly from that purporting to be Berghaus' own in the Stieler atlas and again in Wenz' *Atlas zur Landkarten-Entwurfs-Lehre* (1885).

Finally, in this projection the eye centers, of course, on the Arctic. This is significant with respect to the projection's ancestry, since Berghaus' design was essentially a simplification of Petermann's well-known eight-point star (1865), which in turn was developed originally from a map suggested by G. Jager to illustrate the centrality of the Arctic in animal geography. *(2)* In the insignia of the Association, as it happens, this focus stands as a reminder of Joerg's life-long interest in polar research, and so serves to commemorate a part of the work of an important contributor to American geography.

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*(1)* The star is shown in its current form, as redrawn without essential modification by Guy-Harold Smith.

*(2)* See editorial note at head of Jager, G., "Der Nordpol, ein thiergeographisches Centrum," *Petermann's Geographische Mitteilungen*, Vol. IV, 1865-1867, p. 67.

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ERRATUM:

Substitute Neptune for Venus on page 5, line 5 from the bottom in the second column, of the May, 1960, issue of *The Professional Geographer*.

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ANNUAL MEETING
of the
ASSOCIATION
OF
AMERICAN GEOGRAPHERS

East Lansing, Michigan
Aug. 28 - Sept. 1, 1961

# ASSOCIATION AFFAIRS

## COMMITTEES

### PLACEMENT COMMITTEE

The Placement Committee has completed a review of all members registered as being interested in new positions. File data cards on such individuals are maintained in an active status for two calendar years. Those who have been registered for more than two years without updating their cards are automatically transferred to inactive status. The number of active cards left after the past summer's review is 272. One hundred fifty cards were put in the inactive file. An additional 48 members who are registered with the Placement Committee would be on the Committee mailing list if they had not moved without giving notification of their new addresses.

*Jobs in Geography*, which the Placement Committee publishes monthly, lists gratis all job opportunities which come to the Committee's attention. *JIG* has been successful in fulfilling its purpose, and praise continues to come from both job seekers and employers. This is quite encouraging to the Committee members. Although *JIG* is published primarily for AAG members, it may be obtained upon request by college Geography Departments providing there is an AAG member on the staff.

The Committee is continuing to maintain a roster of foreign geographers seeking employment in the United States. Many of these foreign geographers are well-trained, and in most instances would cooperate in a teacher exchange program. Colleges which may have opportunities for foreign geographers, permanently or otherwise, are urged to use this AAG placement service.

Most job listings for geographers come from teaching institutions but the percentage of openings and employment outside the teaching field continues to grow at an increasing rate. As an example of interest in geographers by non-academic employers, a large and successful management consulting firm recently wrote the Committee saying, "We have not in the past looked to geographers to fill professional positions on our staff, but it would seem we have been missing an opportunity." And an experienced director of an electric utility company writes, ". . . a geographer [is] best qualified to handle the industrial development problems of both utilities and metropolitan areas." Other testimonials indicate a broadening appreciation for the skills and services of geographers. It is quite evident to your Committee that job opportunities for geographers cover a broad horizon, especially in the fields of business and government. Aggressive efforts are being made to make these opportunities known to you through *JIG* and other Placement Committee services.

William Whipple Abbe, Chairman

## NOTE FROM THE EDITORS

The Editors of *The Professional Geographer* have a problem that only the authors of articles, reports, announcements, and other materials submitted for publication can solve, and we are requesting your help. Some two-thirds of the submitted manuscript material (over 100 pages per issue) must be retyped before copy can be given to the printer. This either takes the Editors' time (of which they have too little), or it costs the Association money to hire out the retyping (and such money is scarce and precious).

One of the principal defects of manuscript material is lack of double spacing of lines; the printer will not use single-spaced copy, and this rule applies to headings, tables, footnotes, map captions, and like materials as well as to the main body of the text. Other items which make it necessary to retype copy include manuscript submitted on thin paper (we know the postal

rates have gone up) and that typed on both sides of the page; tables incorporated in the text instead of being typed on separate pages; footnotes that cannot be used (non-bibliographical); footnotes inserted in the text or at the bottom of the page, instead of at the end of the paper; inked-in corrections on pages; materials not properly organized and positioned, such as the headings and signatures for book reviews; and improper capitalizing and italicizing. With regard to the last item, all authors should know that triple underscoring indicates capital letters, double underscoring represents small capital letters, single underscoring means italic letters, and a single wavy underscoring represents bold-faced type. Examination of the style patterns established in previous issues of *The Professional Geographer* will indicate which specifications to indicate on your manuscript.

These and other matters are discussed in the "Suggestions to Contributors" note on the back of the table of contents page. The Editors will be most grateful if all authors will read this page and follow the instructions carefully.

Phyllis R. Griess, Editor
George F. Deasy, Associate Editor

## COPIES OF SOUTHERN CALIFORNIA STUDY AVAILABLE

There is available a supply of the September, 1959 Supplement to the *Annals* entitled *Man, Time, and Space in Southern California*. The study is appropriate for supplementary reading in Historical and Regional Geography, City and Regional Planning, and Geography of California. It is suggested that institutions offering such courses might wish to place several copies in their reference libraries.

The contents include "Man, Time, and Change in the Far Southwest;" "The Evolution of a Wild Landscape, and its Persistence, in Southern California;" "Transformation of Southern California to a Cultivated Land;" "The Spread of an Artificial Landscape over Southern California;" and "The Future of California's Southland." The materials were edited by William C. Thomas, Jr.

The price of the 120-page publication is $1.50. It may be ordered from the Association of American Geographers, 1785 Massachusetts Ave., N.W., Washington 6, D.C.

## REPORT ON NONTRADITIONAL JOBS OF GEOGRAPHERS

A limited number of copies of the March, 1960 report by the Committee on Geographers in Business is available for purchase.

This 61-page mimeographed study, entitled *The Nontraditional Jobs of Geographers*, is the most comprehensive survey and analysis in print of present and potential employment opportunities for geographers. As such, it is valuable both to advisers of geography students and to those personally seeking non-academic and non-Federal positions. It covers such fields as transportation, money and banking, utilities, foods, petroleum, publishing, market research, and mapping.

The price is $2.50 a copy. Orders should be placed with the Association of American Geographers, 1785 Massachusetts Ave., N.W., Washington 6, D.C.

# ANNOUNCEMENTS AND REPORTS

## REPORT ON POLISH INDUSTRIAL GEOGRAPHY

In Poland, industrial geography as a relatively independent branch of research and teaching was established in 1955. The turning point was the Conference at Osieczna where, for the first time, the principle of systematic specialization was introduced into Polish economic geography.

During subsequent years, institutional conditions favorable to the development of industrial geography were created. The first of these was the introduction into all Polish universities of separate lectures and other college activities focused on industrial geography. In this way, students could become acquainted early in their professional career with the possibility of systematic specialization in the field. The second condition was the establishment of a special research unit, in the form of a Department of Industrial Geography, at the Institute of Geography of the Polish Academy of Sciences. The main function of this Department has been the introduction of modern methods into Polish industrial geography, and the promotion of projects which will help to build up a new synthesis of economic geography in Poland. The third condition was the creation, in 1958, of a Committee for Space Economy and Regional Planning in the Polish Academy of Sciences. The objective of this Committee is to explore the possibility of interdisciplinary discussion as a useful device for joint evaluation of geographical studies by economists, geographers, statisticians, city and regional planners, and other specialists dealing with space economy.

At present, Polish industrial geographers are taking full advantage of such favorable conditions, and are employing four approaches in their studies of Polish industrial geography: systematic, regional, topical, and cartographic. The *principium divisionis* of this classification is the starting point of a given investigation. Thus, the systematic approach is used when the focus of interest is a branch of industry, the regional approach when it is an industrial district, the topical approach when it is concerned with more than one branch of industry and more than one industrial district, and the cartographic approach when the main object is the preparation of maps and atlases.

In the systematic field, the most advanced studies in Poland concern the geography of building materials, textiles, and the food industries (see appended bibliography). The author of this report is currently working in this field, as are J. Bolkowski, J. Grzeszczak, B. Kortus, T. Lijewski, M. Najgrakowski, L. Straszewicz, and A. Werwicki.

Utilizing the regional approach, four industrial districts are being investigated by Polish geographers: the Upper Silesian, the Lower Silesian, and the industrial districts of Lodz and Warsaw (see bibliography). Presently, three research projects dealing with the Warsaw Industrial District are in various stages of development. The purpose of the first one, executed under the guidance of Dr. S. Leszczycki by an economic geographer, S. Misztal, is to trace the sequence of events by which the present industrial complex of Warsaw evolved. It uses the technique of cross-sections in time, comparing the structure and distribution of industry in the District in 1880, 1910, 1937, and 1956. The second project, carried on within the framework of the Committee for Space Economy and Regional Planning and executed by an economist, Dr. P. Czartoryski, will be a regional input-output analysis of the Warsaw District in 1957. The results of this study are not yet published. The third project, initiated by the Committee under the guidance of Dr. K. Secomski and executed by a statistician, W. Tomaszewski, will be an attempt to apply the linear programming technique to the analysis of flows between the industrial plants of the Warsaw District. These three projects are part of a large scale study of the Warsaw Metropolitan Region started by

a special Commission of the Committee under the guidance of Dr. M. Kaczorowski.

The topical approach is the most recent type of Polish research in industrial geography. The object of the first study of this type, begun in 1958 by a team of economists and geographers under the guidance of Dr. K. Secomski, was an evaluation of the effects of the industrial locational policy carried on in Poland between 1945 and 1960. During 1960, a new project utilizing the topical approach was initiated within the framework of the Committee for Space Economy and Regional Planning. It involves a team under the guidance of an economic geologist, Dr. A. Bolewski, and is studying the spatial structure of the utilization of minerals by Polish industry. The project will establish and evaluate the place of minerals in the input of Polish industry, and will analyze the spatial problems involved in the industrial extraction, transportation, and transformation of minerals. The geology of mineral deposits and the distribution of extractive industries also will be evaluated. In 1961 a full set of topical studies will be started, so that in 1963 the Committee will be able to publish a volume about industrial location in Poland similar in certain respects to well-known American publications in the field. These studies will mostly be under the guidance of Dr. K. Secomski.

The cartographic approach is best represented by the work of the Institute of Geography of the Polish Academy of Sciences, working in collaboration with the Central Statistical Office and the Planning Commission of the Council of Ministers. Between 1957 and 1960 this group prepared, under the guidance of Dr. S. Leszczycki, an unpublished industrial atlas of Poland. The atlas provides a cartographic synthesis of present information on the spatial structure of industry in Poland, and will serve as a cartographic starting point for discussion and studies concerning the locational changes in Polish industry anticipated between 1960 and 1975.

This review of the present status of industrial geography in Poland can be concluded with the following remarks: (1) The traditional isolation of industrial geography from other disciplines dealing with space economy has ceased to exist in Poland. Geographical investigations in this field are closely interwoven with the activities of economists, statisticians, geologists, and city and regional planners. (2) Through the excellent liaison between the Planning Commission of the Council of Ministers, the Central Statistical Office, the Committee for Space Economy and Regional Planning, and the Institute of Geography of the Polish Academy of Sciences, interested scholars have the necessary supply of statistical data and other materials. Under such conditions, it may be possible to convince the Central Statistical Office of the desirability of including in its records data important to research in space economy. (3) Most research in industrial geography by Polish geographers is concentrated on Polish territory. Recently, projects dealing with other countries have been started.

## SELECTED BIBLIOGRAPHY ON POLISH INDUSTRIAL GEOGRAPHY

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## REPORT ON A NEW CITY AND REGIONAL PLANNING CURRICULUM

The University of Southwestern Louisiana recently introduced a city and regional planning curriculum with geography considered the major field. The problem of providing suitable undergraduate training for a career in planning has been discussed by Theodore Herman ("Undergraduate Preparation for a Planning Career," *The Professional Geographer*, Vol. XII, No. 2, March, 1960, pp. 10-12.), and the case for geography as a basis for work in city planning was well stated by Gary M. Cooper ("Geography as a Foundation for City Planning," *The Journal of Geography*, Vol. LVIII, No. 9, December, 1959, pp. 434-440). Therefore, this discussion of the program at the University of Southwestern Louisiana is intended merely to supplement the two earlier articles.

The new program utilizes previously existing courses, with the exception of two new two-hour courses in the history and theory of urban planning in the Department of Art and Architecture and a new three-hour geography course in city and regional planning. The existing courses are those generally required of most Liberal Arts majors regardless of fields of major study, plus courses in fields from which people have been entering the profession of city and regional planning.

Unlike the regular geography major which requires 28 hours of geography, only 19 or 20 hours of geography are required in the city and regional planning curriculum. Majors must take the freshman geography course, cartography, United States and Canada, and the city and regional planning course. For the remaining six or seven hours of geography, it is suggested that the student enroll in geomorphology, economic geography of eastern United States, economic geography of western United States, geography of Louisiana, or advanced cartography.

The program in semester hours, excluding physical education or air science, is as follows:

*Freshman Year*:
- 6 – English Composition and Rhetoric
- 6 – Algebra and Trigonometry
- 6 – European History or Art History
- 6 – Architectural Design
- 6 – Foreign Language
- 3 – Geography

*Sophomore Year*:
- 6 – English Literature
- 6 – American History
- 6 – Architectural Design
- 6 – Foreign Language
- 6 – Introduction to Politics and American Government
- 3 – General Sociology

*Junior Year*:
- 6-8 – Mathematics or Science
- 4 – History and Theory of City Planning
- 3 – General Anthropology
- 3 – Urban and Rural Sociology
- 3 – Economics
- 3 – State and Local Government
- 3 – Public Administration
- 3 – Geography of United States and Canada
- 4 – Cartography

*Senior Year*:
- 3 – Statistics
- 3 – Speech
- 6 – Advanced and Technical Writing
- 3 – City and Regional Planning
- 6-7 – Geography
- 9 – Controlled Electives outside Geography

Robert M. Crisler
University of Southwestern Louisiana

## NEWS FROM GEOGRAPHIC CENTERS

### FLORIDA, UNIVERSITY OF

James R. Anderson was appointed as the new Chairman of the Department in March, 1960 to take over the duties from William H. Pierson who had acted as Chairman for nearly a year. Sigismond deR. Diettrich resigned as Chairman in March, 1959 after more than 25 years of outstanding service to geography at the University of Florida. He is currently in his second year of a Fulbright assignment at Dacca University in East Pakistan.

Dr. Anderson came to Gainesville from the Agricultural Research Service of the U.S. Department of Agriculture. He had worked there for eight years in a position formerly held by Dr. O.E. Baker, under whom he had studied for the Ph.D. degree at the University of Maryland. After receiving the degree in 1950, Dr. Anderson remained on the staff at Maryland as Assistant Professor for two years.

Other members of the staff of 10 have been actively engaged in a number of projects and assignments. Raymond E. Crist traveled in various Latin American countries this summer. He worked with his graduate students in the field and also carried forward studies of his own. Donald R. Dyer returned to the campus for summer school after a two-year Fulbright assignment in Peru, where he taught at the Catholic University and at the University of San Marcos in Lima. John R. Dunkle spent most of the summer in St. Augustine serving as a consultant for the State Historical Restoration and Reconstruction Committee which is formulating plans for the restoration of old St. Augustine.

Clark I. Cross was employed again as chief naturalist in Mount Rainier National Park. Richard L. Day was in Colorado working in the field. Robert B. Marcus taught on the summer school staff, offering courses in the Geography of Florida and Resource Utilization. Charles B. Varney taught at Florida State University in Tallahassee during the summer. He also did field work in the Cedar Keys area for his dissertation on which he is working at Clark University. Robert A. Davis was employed at Chautauqua Lake, New York and also spent part of the summer in the field in New England and the Maritime Provinces.

This fall Erwin Raisz returns to the Department as Visiting Professor. In addition to teaching cartography and regional physiography, he will put the finishing touches on the *Atlas of Florida* which is being prepared for printing.

### NEBRASKA, UNIVERSITY OF

Summer activities of the staff include the following items. Professor Robert G. Bowman is serving as Visiting Professor at the University of British Columbia. Professor Leslie Hewes, Chairman, is continuing research on Risk in the Central Great Plains, followed by six weeks teaching in the second summer session of the University of California, Berkeley. Dr. Charles B. McIntosh, Assistant Professor, is serving as Acting Chairman of the Department during the 1960 summer sessions. Dr. Rayfred Stevens, Assistant Professor, is doing research on geographical ideas of Montesquieu in France on a University of Nebraska Summer Research Fellowship, and plans to attend the International Geographical Congress in Stockholm. Goren Norstrom, Visiting Instructor, has returned to the staff of the Stockholm School of Economics.

In addition to Professor McIntosh, others teaching in summer school are Professor Raymond E. Murphy, Clark University, Professor Robert Carmin, University of Illinois, and Professor Frank Sorenson, Director of Summer Sessions.

During the academic year, 1960-1961, Professor Walter Strzygowski, Professor of Economic Geography and Head of the Institute of Regional and City Planning, Hochschule fur Welthandel, Vienna, will serve as Visiting Professor. All regular full-time staff members will be in residence. Dr. John C. Weaver, Dean of the Graduate College, continues to serve as a member of the Graduate Committee of the Department. Richard E. Myers, U.S. Weather Bureau, continues as Lecturer in Meteorology.

### OHIO STATE UNIVERSITY

Guy-Harold Smith was named President-Elect of the Ohio Academy of Science at the Antioch meeting of the Council of the Academy in April, 1960. Robert S. Platt has been appointed as a Mershon Visiting Professor for the Spring Quarter, 1961. Professor Platt will be returning to his home town; he is a native of Columbus. Don R. Hoy has been appointed as an Assistant Professor and will begin his duties in late September. John R. Randall has been awarded Assigned Research Duty for the Winter Quarter, 1961. He will be relieved of all teaching duties during the Quarter.

The University budget for 1960-1961 provided for the advancement of Jack R. Villmow to the rank of Associate Professor and Roland E. Chardon to Assistant Professor. S. Earl Brown, off duty during the Spring and Summer Quarters, spent over three months in Europe. He received a grant from the Social Science Research Council to support, in part, his attendance at the Stockholm meeting of the International Geographical Union.

Eugene Van Cleef (Professor Emeritus) and Mrs. Van Cleef spent two months (March 10 to May 10) on a trip around the world. They visited former graduate students of the Department in Honolulu, Tokyo, New Delhi, and Athens. David W. Ganyard, an Assistant Instructor and candidate for the Ph.D. degree, has accepted a position at Morris Harvey College, Charleston, West Virginia. During the Summer Quarter Alfred J. Wright taught his course on the Localization of Manufacturing Industries at the University's Graduate Center at Wright-Patterson Air Force Base. Jack R. Villmow, on leave to teach at Wellesley College during 1959-1960, taught at Peabody College during the first term of the Summer Quarter. After a hurried trip to the Soviet Union he will return to duty in the Autumn Quarter, 1960.

### PENNSYLVANIA STATE UNIVERSITY

The academic year, July 1, 1959 to June 30, 1960, has been a busy and productive one for the Geography Department at Penn State. A resume of selected Departmental activities follows.

*Publications by Faculty Members.* Tangible evidence of research accomplished by Departmental members is provided by the following list of publications. All appeared during the period July 1, 1959 to June 30, 1960.

E. Willard Miller: "World Patterns and Trends in Energy Consumption," *Journal of Geography*, Vol. 58, pp. 269-279, Sept., 1959; "Population and Functional Changes of Villages in Western Pennsylvania," *The Western Pennsylvania Historical Magazine*, Vol. 43, pp. 60-75, March, 1960; "Mineral Regionalism of the Canadian Shield," *The Canadian Geographer*, Vol. 13, pp. 17-30, 1959.

George F. Deasy and Phyllis R. Griess: "Competitive Capabilities of Pennsylvania's Electric Generating Plants in the Coming Atomic Era," *Proceedings of the Pennsylvania Academy of Science*, Vol. 33, pp. 134-148, Oct., 1959; *Atlas of Pennsylvania Coal and Coal Mining: Part I, Bituminous Coal*, v and 69 pp., Bul. 73, Mineral Industries Experiment Station, The Pennsylvania State University, Dec., 1959; "Preliminary Statement on Fuels for Electricity in Pennsylvania," *Mineral Industries*, Vol. 29, pp. 2-3, Feb., 1960; "Factors Influencing Distribution of Steam-Electric Generating Plants," *The Professional Geographer*, Vol. 12, pp. 1-4, May, 1960.

Phyllis R. Griess and George F. Deasy: "Progress Report on the Atlas of Pennsylvania Coal and Coal Mining," *Proceedings of the Pennsylvania Academy of Science*, Vol. 33, pp. 125-133, Oct., 1959; and Phyllis R. Griess, alone: "Great Salt Lake," *Collier's Encyclopedia*, Vol. 9, pp. 1B-1C, 1960; "South Africa," *The Book of Knowledge*, Vol. 6, pp. 1969-1973, 1960.

Allan L. Rodgers: "Regional Industrial Development With Reference to Southern Italy," *Essays on Geography and Economic Development*, The University of Chicago, Department of Geography, Research Paper No. 62, pp. 143-173, 1960; *The Industrial Geography of the Port of Genova*, The University of Chicago, Department of Geography, Research Paper No. 65, 144 pp., June, 1960.

Frederick L. Wernstedt: *World Climatic Data – Africa*, 105 pp., Commercial Printing, Inc., State College, Pa., 1960.

David A. Smith, "'Home Movies' in the Geography Classroom," *Journal of Geography*, Vol. 59, pp. 87-90, Feb., 1960.

Peirce F. Lewis: "Linear Topography in the Southwestern Palouse, Washington-Oregon," *Annals of the Association of American Geographers*, Vol. 50, pp. 98-111, June, 1960.

Paul D. Simkins (co-author): "Recent Migration to Maricopa County," *Arizona Business Bulletin*, Vol. 6, pp. 7-12, Oct., 1959; "Recent Migration to Northern Arizona," *Arizona Business Bulletin*, Vol. 7, pp. 7-12, March, 1960.

*Appointments, Grants, and Leaves.* A selected list of other professional accomplishments and honors pertaining to the staff includes the following:

E. Willard Miller: sabbatical leave, Spring and Summer, 1960 (travel and study in Europe); NSF grant (IGU meetings); contributing editor, *Encyclopaedia Britannica* and *Chambers Encyclopedia;* Geographic Editor, Thomas Y. Crowell Company.

George F. Deasy: Acting Head, Department of Geography, Spring and Summer, 1960; Vice President, Pennsylvania Academy of Science, 1960-61; Treasurer, AAG, 1959-62; Associate Editor, *The Professional Geographer*, 1960-63; contributing editor, *Collier's Encyclopedia* and *Grolier Encyclopedia;* Pennsylvania State University, Mineral Conservation Section research grant (anthracite).

Phyllis R. Griess: Editor, *The Professional Geographer*, 1960-63; contributing editor, *Collier's Encyclopedia* and *Grolier Encyclopedia;* Pennsylvania State University, Mineral Conservation Section research grant (anthracite).

Allan L. Rodgers: Guggenheim, Fulbright, and Inter-University Committee travel grants, 1960-61 (Italy, USSR, IGU meetings); contributing editor, *Collier's Encyclopedia* and *Grolier Encyclopedia.*

Frederick L. Wernstedt: contributing editor, *Worldmark International Encyclopedia* and *Grolier Encyclopedia.*

David A. Smith: NSF grant (IGU meetings); Pennsylvania State University, Central Fund for Research grant (air transportation).

Peirce F. Lewis: First prize, AAG Participation Fellowship Award (IGU meetings); Pennsylvania State University, Central Fund for Research grants (loess and dunes).

Paul D. Simkins: Pennsylvania State University, Central Fund for Research grant (Central America).

### PITTSBURGH, UNIVERSITY OF

The newly-established visiting professorship in the Department of Geography at the University of Pittsburgh brought Richard Edes Harrison and John A. Morrison to Pittsburgh during the 1959-1960 academic year. This year, the chair will be filled by Professor Ernest A. Boateng of the University College of Ghana during the Fall Trimester, and Richard Edes Harrison will return during the Winter Trimester. Professor Boateng is a graduate of Oxford University and at the present time holds the chair of geography at his home university. He will offer undergraduate as well as graduate courses in the Africa Program. During the spring of 1961, Professor Boateng will be at the African Studies Center at the University of California, Los Angeles.

John E. Rickert joined the permanent staff of the Geography Department in September, 1960 with the rank of Assistant Professor. Dr. Rickert did his graduate work at Rutgers University and at Clark University, and has been City Planner of Worcester, Mass., prior to his appointment here. He has also worked with Jean Gottman at the Institute of Advanced Studies at Princeton in the latter's Megalopolis project. Professor Rickert will offer courses in the field of Urban Planning and Urban Renewal.

Hibberd V. B. Kline, Jr., Chairman of the Geography Department since the Fall of 1959, heads an African Program which he established at Pittsburgh in conjunction with other Social Science Departments. He represented Pittsburgh at the International Geographical Union meetings in Stockholm

in August. Norman Carls spent a second year on leave to devote time to his textbook writing. Oswald Schmidt has rejoined the Department after a two-year Fulbright Fellowship in Pakistan, where he taught at Dacca University. Leonard Kuntz continues his long-term research project on the cultural geography of Pittsburgh.

Mary Viola Phillips and Erich F. Bordne were guests at a recent University tea honoring their publications. Professor Phillips' book is entitled *World Geography for High Schools*, and was published by Winston and Co. in 1960. Professor Bordne's book, *Water Resources of a Western New York Region*, was published in 1960 by the Syracuse University Press.

### WEST VIRGINIA UNIVERSITY

Leroy O. Myers has rejoined the staff after a two-year leave of absence. He was the recipient of a Sears-Roebuck Foundation Grant in the City Planning and Urban Renewal Fellowship Program, beginning in 1957. In the Spring Semester, 1960, he initiated a course in urban planning at the University.

Robert N. Reece, who replaced Mr. Myers during his leave, is at the University of North Carolina doing graduate work.

## OTHER ITEMS

### AAAS MEETING, DECEMBER 1960

The 1960 meeting of the American Association for the Advancement of Science, to be held in New York, will include a program of interest to many geographers. Section E (Geology and Geography) meetings are to be held in the Belmont Plaza Hotel during the period December 27 - 30 (see *The Professional Geographer*, May, 1960, p. 38).

The geography program, which is sponsored by the AAG, will begin on Tuesday morning, December 27, with a session of contributed papers. An afternoon symposium on Soviet Geography will be run concurrently with another one dealing with Late Postglacial Events in Southern South America.

For Wednesday morning, a symposium on Urban Renewal has been arranged as part of a series of interdisciplinary sessions. An open house at the American Geographical Society will be held Wednesday afternoon between 4 and 5 p.m.

The Thursday meetings are to include a symposium on Problems of the New York Metropolitan Region in the morning, and another on Africa South of the Sahara in the afternoon. A dinner has tentatively been scheduled for Thursday evening.

On Friday morning, December 30, there will be a symposium on Programming the Use of Natural Resources and Raw Materials. In the afternoon, another session of contributed papers will conclude the Section E meetings except for a lecture and film presented by the National Geographic Society on Friday evening.

Geologists in Section E are planning several sessions on Geologic Frontiers, one on the Mohole, another on Selenology (geology of the moon), and one to explore the field of palynology. The programs of many other sections will also interest geographers as will the general sessions, special events, and exhibits arranged by the parent organization.

Information about the geography meetings may be obtained from the AAG coordinator for Section E, Charles C. Morrison, Jr., American Geographical Society, Broadway at 156 Street, New York 32, N. Y.

### NEW GEOGRAPHICAL PUBLICATION

The California Council of Geography Teachers announces publication of a new geographical journal, *The California Geographer*, under the editorship of Robert A. Kennelly, Long Beach State College. The publication will appear once a year, in the late Spring, and will include articles of general geographical interest. The subscription rate for non-members is $2.00 per year.

### SEVENTH INTERNATIONAL CONGRESS OF TOPONYMIC AND ONOMASTIC SCIENCES

The Seventh International Congress of Toponymic and Onomastic Sciences will be held in Florence and Pisa, Italy, during the Easter period, 1961. The Congress is sponsored by the President of Italy and by the Secretary of State for Education, and is supported by the Universities of Florence and Pisa as well as by the Instituto Geografico Militare of Florence.

Any scientific communication on topics connected with the subject of the Congress will be accepted just as in previous Congresses. The coming sessions will deal primarily with the three following subjects: (1) Indoeuropeans and Pre-Indoeuropeans in the Mediterranean basin as determined from toponymic and onomastic evidence; (2) Latin and Teutonic onomastics in the Dark Ages; (3) local names in cartography. It is believed that these subjects will meet with the approval of Congress members; in Italy they have been fully approved by archeologists and geographers.

The Chairman of the Managing Committee extends an invitation to geographers to join in the Congress. Summaries of papers to be offered for presentation at the meetings should be sent to the Secretary of the Managing Committee, Professor Carlo Battisti, c/o Instituto di Glottologia, Universita di Firenze, 4, Piazza S. Marco, Firenze, Italy, not later than January 15, 1961.

### NEW GRADUATE PROGRAM IN LATIN AMERICAN STUDIES

A Graduate Program in Latin American Studies has been instituted at Louisiana State University. The program offers the Master of Arts Degree with a thesis or a non-thesis option and with the following areas of concentration: Anthropology, Finance-Economics, Geography, Government, History, Sociology, and Latin American Literature. The Program is intended to (1) prepare the student for non-academic careers in government, business, or foreign service, and (2) to equip the student to continue his graduate work in his chosen area of concentration. Inquiries should be addressed to Graduate Program in Latin American Studies, 150 Himes Hall, Louisiana State University, Baton Rouge 3, Louisiana.

### INSTITUTE ON QUANTITATIVE METHODS

Northwestern University, in collaboration with The University of Chicago, has been making tentative plans to operate an institute on the application of quantitative methods in geographic research. The institute, now planned for Summer, 1961, would be designed for college teachers of geography whose training did not include formal experience with the application of quantitative methods in geographic problems. Its specific motive would be to narrow the gap between geographic teaching and research by enabling more geographers to evaluate recent quantitative research and to incorporate useful findings into their own teaching and future research. If foundation support is forthcoming for such an institute, announcements will be made in *The Professional Geographer*. In the meantime, interested geographers will find it worthwhile to sit in on an introductory statistics course during the coming academic year inasmuch as such a course will be a prerequisite to participation in the institute. For additional information, write Dr. Edward J. Taaffe, Department of Geography, Northwestern University, Evanston, Illinois.

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**PERSPECTIVE ON THE NATURE OF GEOGRAPHY**

**Richard Hartshorne**

201 pp., $5.00, 1959

Rand McNally and Company
P. O. Box 7600, Chicago 80, Ill.

**Harlan H. Barrows, President of the AAG in 1922, Vice-President in 1917 and 1920, and Editor of the** Annals **in 1915, died May 15, 1960 at the age of 83. He served as Chairman of the Department of Geography at the University of Chicago from 1919 to 1942, and was co-author of** Elements of Geography **(1912) and of an elementary geography series.**

**Hugh H. Bennett, President of the AAG in 1943 and first chief of the U.S. Soil Conservation Service, died July 7, 1960 at the age of 79. He was world renowned for his work in the field of soil conservation.**

**Edna E. Eisen, a member of the AAG, died May, 1960 at the age of 64. She taught in the Milwaukee public schools from 1915 to 1935, and in the Geography Department of Kent State University from 1935 to 1960. Her publications dealt primarily with educational facets of geography.**

**George David Hubbard, Vice President of the AAG in 1931, died June 11, 1958 at the age of 87. He was Professor of Geography, Oberlin College, from 1910 to 1936; Visiting Professor, University of Missouri, from 1942 to 1948; and author of** Geography of Europe **(1937; 1952).**

**Anna C. Robinson, a member of the AAG and wife of Malcolm E. Robinson, died on April 23, 1960.**

**Lucius E. Snyder, Jr., a member of the AAG, died February 15, 1960 at the age of 64. He had been on the staff of the Geography Department at Memphis State University since 1933.**

**Edgar Nelson Transeau, a member of the AAG since 1905, died January 25, 1960 at the age of 84. He was long chairman of the Department of Botany at Ohio State University and was honored as one of the world's leading ecologists.**

# COMMUNICATIONS FROM READERS

## TRANSIT RIGHTS AND OBLIGATIONS

Dear Editor:

The recent capture of an American pilot in the USSR and the resulting international implications are encouraging me to put forward publicly ideas on the transit rights and obligations of professional geographers which I have developed since World War II.

Geographical research entails primarily surveys of the earth, be it original exploration, or studies of changing plant, animal, and human distributions including land utilization, transportation, and industrial location surveys. To carry out this research, professional geographers should have the right to enter or survey from the air any part of the earth without restrictions except as indicated below. This basic right of professional geographers should override the sovereign power of states and any resulting private rights. Although this right has not been clearly expressed before, there is no doubt that most geographers have assumed such a right to exist, for example Sven Hedin.

Exceptions to this right could be permitted to allow privacy in enclosed places (homes, houses of worship; also harems, nudist camps, etc.) provided an excluded area does not exceed a contiguous space of one square kilometer. Areas with high radiation rates or from which diseases may spread can be temporarily closed to geographical research.

To assure this basic right to geographers no state should charge, or permit to be charged, transportation or accommodation fees in excess of actual costs together with a reasonable allowance for overhead. This right to reasonable transportation charges can be adapted from the Barcelona Convention on International Transit (League of Nations, 1921; see author's note on the subject of this convention in the *Geographical Review*, Vol. XLIII, October, 1953, pp. 568-570).

In return for this right, professional geographers should be obliged to make their findings public, releasing their notes, maps, and photographs to any qualified applicant. The professional status both of geographers and applicants for results of geographical research should be decided upon by accredited national committees. Disputes regarding the reasonableness of closure of areas to geographers, release of notes, and definition of professional status should ultimately be decided upon by the International Court in The Hague.

I do not believe that these ideas can be carried into practice immediately. All I wish to achieve in putting them forward is to encourage discussion which may possibly result in the formulation of a proposal to the International Geographical Union. If this discussion should reduce the restrictions upon geographical work now imposed by many states, I shall be more than pleased. Ultimately, I hope that an international declaration on the rights and obligations of geographers will both reduce international tension and increase and improve geographical research.

Alexander Melamid
New York University

## MEMO TO FIELD TRIP LEADERS

Dear Editor:

Geography through the years has kept pace with the changing world, and has successfully advanced from the horse-and-buggy to the rocket age. Consequently it has been attracting increasing numbers of modern, progressive men and women. It is in behalf of these women, of all ages and ranks, that this memo is written, for there remains one noticeable lag in our profession.

Geography is a masculine field in that its members, male or female, are all geog-

raphers; there are no geographesses. In this respect it resembles other sciences, but geography carries the masculine emphasis further than some. This becomes particularly apparent during cross-country field trips, on which occasions the non-male minority is unfortunately discriminated against. The discrimination referred to is not confined to any particular part of the country, according to accumulated reports, and has continuing support even from young men in our ranks. The question long heard among women geographers is, "Can't something be done about it?" It seems that some light needs to be thrown on this practice unless it is to be needlessly perpetuated.

The pattern of a geography field trip too often runs something like this. The leader, invariably a man, starts the excursion early in the morning, dispatching the cars or buses with full gas tanks for an uninterrupted all-day tour. During the ensuing hours tour members will probably traverse barbed wire fences, mud holes, near-perpendicular slopes, and very fertile fields, and then pause at mid-day for a picnic lunch in a gravel pit or ditch. Of all this there is no complaint. But, to continue.

At the various stops en route the male members briefly absent themselves from the group from time to time. Sometime in the afternoon the tour leader begins to show grave gentlemanly concern, and with proper shyness and solicitude approaches the non-males privately and tells them discretely that he will try to keep the males occupied for a few moments if they would like to stray to the sidelines. Often he is even obliging enough to call attention to a semi-secluded rock pile or clump of bushes (frequently leafless) almost out of sight of a highway or farmer's house.

Stating the point as delicately as possible, non-males for reasons beyond the scope of this memo, do appreciate a twentieth century restroom, however plain. Nowadays, when service stations are as easily come upon as thickets or gullies, this subject should not even have to be mentioned; but this primitiveness, or unawareness, persists in our enlightened epoch incongruously alongside electronic computing, moon mapping, new perspectives, and help to backward peoples!

It is hoped that none of our fine gentlemen colleagues will be offended by what has been said and that they will be as good sports about this as we women have been. To those many thoughtful tour leaders who do not need this reminder, our thanks. The matter is brought up not in jest, but in a serious attempt to raise the dignity of the profession and to improve conditions for women in the field. After all, geography is cultural as well as physical.

Gwen M. Schultz
University of Wisconsin

For textbook or reference:

**AMERICAN GEOGRAPHY:**

**INVENTORY AND PROSPECT**

Editors: PRESTON E. JAMES CLARENCE F. JONES

ASSOCIATION OF AMERICAN GEOGRAPHERS
1785 Massachusetts Avenue, N.W.
Washington 6, D.C.

*590 pp., illust.* *Price $6.00*

## NEW PUBLICATIONS

*The San Francisco Bay Area: A Metropolis in Perspective.* MEL SCOTT. University of California Press. Berkeley and Los Angeles. 1959. ix and 333 pp. illust. $12.50.

As larger percentages of our population congregate in cities, and as these cities grow and develop the problems associated with congestion and blight, the need for urban understanding increases. *The San Francisco Bay Area* is an authoritative and fascinating analysis of metropolitan San Francisco. The author sees clearly the interrelatedness of the various parts of the area and looks upon it as a geographic entity. The book is an excellent guide to good metropolitan citizenship for local residents: it also should prove useful to residents of other metropolitan areas and to geographers and other scholars interested in urban development and problems.

The urban geographer probably would not have prepared the volume in exactly the same way and might have made better use of maps, but he would have a difficult time pointing to a similar product which has so much to commend it.

Mel Scott is a Lecturer in City Planning at the University of California, and Head of the City and Regional Planning Department of University Extension. He is the author of two earlier works, *Cities are for People*, and *Metropolitan Los Angeles: One Community*.

The San Francisco Bay area is viewed historically, and a keen interest and insight into the future is exhibited. The physical, social, and economic forces that have been active are carefully analyzed and the impact of everything from earthquakes to intercity conflicts are considered. Emphasis is placed on the need for area-wide planning and administration.

The volume is a handsome and valuable addition to the literature on urban areas.

JOHN H. THOMPSON
*Syracuse University*

*Elements of Cartography*, 2nd edition. ARTHUR H. ROBINSON. John Wiley and Sons, Inc. New York. 1960. vii and 343 pp. illust. $8.75.

Since initial publication of this well known and highly praised textbook seven years ago, significant changes and technical developments have taken place in the art and science of cartography. A revised edition, therefore, is most appropriate at this time.

Modifications and additions in the second edition are abundant, for much of the text material is rewritten and many new illustrations are included. One of the most notable and fundamental changes is a complete reorganization of topics dealing with symbolization and representation of mapped data. These materials are now expanded to three chapters, and treatment includes elementary statistical concepts appropriate to cartography. The subject of map projections also is reorganized, to permit more comprehensive treatment and the inclusion of a nonmathematical introductory chapter on the nature and uses of map projections. New reference materials are incorporated in the expanded Appendix, which now contains such useful data as logarithms, projection tables, and lettering magnification scales.

The new second edition of this work succeeds admirably in developing the principles and techniques pertinent to the primary processes of cartography, viz., the conceptual planning and design of maps as media for research and communication in the field of geography and other disciplines.

CLIFFORD H. MACFADDEN
*University of California, Los Angeles*

*1000 California Place Names.* ERWIN G. GUDDE. University of California Press. Berkeley and Los Angeles. 1959. viii and 96 pp. $1.25.

This is a fascinating little book which can hardly fail to intrigue geographers who

have any curiosity whatsoever about the derivation of place names. Historically-minded geographers, in particular, will find much of interest.

As stated in the Preface, the book presents in convenient, alphabetical form the stories that lie behind the names of California's counties, cities, rivers, lakes, mountains, bays, and some of the topographic features "which arouse the traveler's or reader's interest." The publication is based upon a much larger volume, the revised edition of *California Place Names* (1959), and of course contains only a small proportion of the names listed in the parent book. Selection of places to be included in *1000 California Place Names* was made on the basis of their importance, to which were added certain minor places of special historical interest.

Although the source of information concerning each individual name is not given, a list of some of the major references is included in the Preface. A number of these sources also contain information regarding the derivation of place names elsewhere in the United States.

P.R.G.

*Dictionary of the American Indian.* JOHN STOUTENBURGH, JR. Philosophical Library, Inc. New York. 1960. 462 pp. $10.00.

This volume will find its place on the geographer's bookshelf as an easily used reference tool for identifying and locating a large number of Indian place names, Indian tribes, and related topics which are occasionally encountered as puzzling words on maps and documents.

The dictionary concerns itself principally with the tribes living in America at the time of the white man's arrival. Only those tribes situated within the present confines of the United States are covered. In some instances entries are rather brief, but information on many of the earlier Indian groups is scanty so the brevity is understandable.

The subject matter is varied. Included are English meanings of selected Indian words chosen from a number of linguistic families, thumbnail biographical sketches of more familiar Indian personages, Indian origins for some of our present-day place names, locations of early villages and cultures, and some descriptions of various tribes, their subdivisions, and places of settlement.

Aside from its primary function as a dictionary of Indian names and terms, the book serves as a useful complement to published literature on the North American Indian. For example, in seeking to identify either an obscure settlement or tribal subdivision, one can consult the alphabetical entries to determine which village the name represents, what relationship it may bear to larger and more familiar tribes, and where the site is located. Armed with these primary facts, the user can then refer to more definitive works, saving much effort in tracking down clues to little-known groups or sites in ill-defined geographic regions.

An interesting feature of the dictionary is the inclusion of Indian names from which those of a number of our present cities are derived. It is thus possible to discover, by means of the present name of a place, the identity of Indian groups first associated with the area. For workers in the fields of historical geography and ethnology this compilation on the American Indian should prove a handy source book.

JOSEPH F. WINKLER
*National Park Service*

*Southwest Asia: Environment and Its Relationship to Military Activities.* Technical Report EP-118. Quartermaster Research and Engineering Center, Environmental Protection Research Division. Natick, Massachusetts. July 1959. vi and 99 pp. illust.

Although written primarily for the use of military personnel, this booklet contains considerable information of interest to the geographer specializing in Southwest Asia or in arid land environments. Its most interesting feature is the numerous maps, 41 of which are used to show distribution of a wide variety of phenomena.

In the first section, 28 maps and 18 pages of text provide a brief survey of the physical and cultural geography of the area, with special emphasis on climate. There are 17 maps of climatic elements, 16 cli-

mate graphs, one topographic map, and two maps of resources. The eight maps dealing with cultural elements show the distribution of transportation facilities, population, languages, nomadism, ethnic minorities, and religions, as well as the locations of political boundaries and of cities.

Maps in the second section represent variations in the effects of heat and aridity upon men engaged in different types of activities in the area. Such items as daily water requirements, survival time without water, time to impairment of men doing various degrees of work, areas in which work can be carried on, and areas of reduced performance, are mapped.

The third section deals with the effects of the environment upon materiel. There is one map of clothing requirement areas, two of food storage life areas, and one each of areas of gasoline storage life, probability of equipment difficulty, and microbiological deterioration.

The booklet concludes with a nine-item reference list and a glossary of special terms.

DAVID A. SMITH

*The Pennsylvania State University*

*Studies of Highway Development and Geographic Change.* WILLIAM GARRISON, BRIAN BERRY, DUANE MARBLE, JOHN NYSTUEN, AND RICHARD MORRILL. University of Washington Press. Seattle. 1959. xvi and 291 pp. illust. $7.50.

This study, by a team of geographers at the University of Washington, focuses its attention on the economic impact of highway developments on retail business, residential areas, and service centers and their associated trade areas. It attempts to develop methods for assessing benefits from the development of highways.

The book is divided into five parts. The introductory section discusses the place of transportation in the structure of economic activities, introduces the problems of highway development, and gives examples of empirical and theoretical research which could contribute to the solution of these problems. Section II analyzes the impact of highway development on retail business. The third part analyzes the influence of such developments on residential site selection. Section IV treats the relationship between customer movement and retail businesses and changes in transportation. The final section discusses the problem of service centers, their tributary areas, and their reaction to transportation developments; it utilizes medical services as an indicator of such responses.

The study is well conceived, clearly written, excellently produced, and well illustrated. It is highly recommended to both the general student of economic geography and the specialist in transportation on the urban scene.

ALLAN L. RODGERS

*The Pennsylvania State University*

*Freight and the Metropolis.* BENJAMIN CHINITZ. Harvard University Press. Cambridge. 1960. vii and 211 pp. illust. $4.50.

This is the sixth volume of a project undertaken by the New York Metropolitan Region Study through the Graduate School of Public Administration at Harvard University. Although the book is primarily concerned with metropolitan New York, it is broadly written and ties New York solidly to the rest of the United States. Consequently, it should be of use not only to urban geographers, but to all geographers interested in the regional analysis of Anglo-America. Particular emphasis is placed on changing spatial characteristics of manufacturing in relation to improvements in transportation from the early 19th century to the present.

The book is divided into two parts. Part I is concerned with the historical relative decline of the port of New York and some of the causes and consequences. Part II explains the nature of New York's manufacturing activity and specifies the role of transportation in altering the location, characteristics, and degree of concentration of manufacturing in metropolitan New York and the nation. The book also contains an appendix which includes inbound and out-

bound freight movements for given types of manufacturing activities to and from New York and other areas in the United States.

The major theme throughout the book is the varying impact of transportation improvements on the location of manufacturing and the consequent importance to specific cities and to major parts of the nation. The particular spatial impacts of water, rail, and highway freight transportation are thoroughly presented. Causes for the centralizing effects of railroads in the early 20th century with the then prevalent emphasis on long hauls, and the decentralizing effects of the current truck era with its bias toward lower terminal costs and short hauls, for example, are presented in separate chapters.

Chinitz points out that recently induced truck trends toward relatively lower terminal and short-haul costs, along with higher freight costs by rail of finished products relative to raw materials, largely explain the present degree of urban suburbanization and national decentralization. Both have resulted in a distribution of manufacturing activity that more nearly approximates that of population. Chinitz also predicts that railroads may soon begin to increase the costs of raw material shipments relative to manufactured products, and to this extent may thus begin to curb decentralization toward markets. He states, further, that freeways should raise the spatial hierarchy of most trade areas and therefore encourage the growth of regional, rather than local, centers.

The book is primarily a summary and documentation of well-known and widely-used geographical concepts. It adds very little that is entirely new. Of concern to the geographer is the fact that both the urban and national regions used are too large and too arbitrary to be analytically operational. However, the book is concise, to the point, and well written. It is especially useful as a review of some basic spatial principles, and it provides some excellent examples of how they operate. Undeniably, the book is concerned with a key element of geography and deserves special attention and reading by geographers.

RONALD R. BOYCE

*Washington University*

*The Wealth of India: A Dictionary of Indian Raw Materials and Industrial Products.* Raw Materials. Vol. V: H through K. Council of Scientific and Industrial Research. New Delhi. 1959. xxv and 332 pp. illust. Rupees 30.

This volume completes the first half of the group of 10 volumes in the Wealth of India series on raw materials. It contains 380 entries, including 370 on plant species, seven on animals, and three on minerals. Such important subjects as *Hevea* (rubber), *Hordeum* (barley), Insects and Insect Pests, *Impomea* (sweet potatoes), and Iron Ores are treated. Common names, including native Indian names, of plants are cross-indexed to the scientific names. There are references throughout to original sources of information. The volume is richly illustrated with line drawings, photographs, and color plates.

This book is an excellent continuation of previously issued volumes. The completed series will be a useful reference in all libraries, universities, and scientific organizations, and an indispensible source for specialists on subject matter relating to India and, indeed, to many other tropical or subtropical regions.

JOHN E. BRUSH

*Rutgers — The State University*

*Nepal: A Cultural and Physical Geography.* PRADYUMNA P. KARAN. University of Kentucky Press. Lexington. May 1960. 100 pp. illust. $10.00.

Few other areas of equivalent size and world significance on the globe have been so handsomely favored by the bookmaking guild as has little, far-off Nepal in the above volume. In terms of physical appearance, the recently issued geography of that country can only be described in superlatives. The generous size of its pages (10½ by 13¾ inches) provides more than ample dimensions for maps representing such a small country. Page margins are wide to the point of lavishness; weight and quality of paper are imposing; and the stiff, two-color, half-tone decorated cover is striking. It is not surprising, therefore, to find

that publication of the book was aided by a grant from The Ford Foundation. No private concern, and few university presses, could afford such luxury in a book with so obviously limited a market.

The contents of the volume likewise merit above average commendation, especially in view of the relatively meager source materials that must have been available to the author on such a little known recess of the world. Twelve chapters, 35 surprisingly detailed maps of all or selected parts of the country, and 60 photographs cover the gamut of standard subjects in a geographical study of a nation – climate, topography, vegetation, soil, history, land use and agriculture, population and settlement, culture, health, minerals, industry, transportation, trade, and so forth. Particularly favorable comment is merited by the high quality of cartographic design and execution apparent in the maps, and by the great amount of research that must have preceded their construction.

Valuable bibliographies follow most of the chapters, and a selected list of geographical source materials concludes the study. The collaboration of William M. Jenkins, a political scientist at the University of Kentucky, is acknowledged on the title page and in the Preface.

G.F.D.

*Baedeker's Autoguide-Benelux:Belgium, Holland, and Luxembourg.* The Macmillan Company. New York. 1958. 256 pp. illust. $6.00.

The name Baedeker is synonymous with guidebooks. In fact, Webster's Collegiate Dictionary says of the word Baedeker, "A guidebook of the series established by Karl Baedeker; loosely, any guidebook." Such a distinction was earned by the publishing, for over a century, of guidebooks noted for their detail and accuracy. It is a pleasure to see the return of the Baedeker series, after a World War II lapse, and to welcome the innovation of a series of Autoguides.

The Autoguide to Belgium, Holland, and Luxembourg is divided into four main parts. Part A is entitled General Information. The first heading under General Information is Geography, written by Professor Theodor Kraus. Twelve pages are devoted to a brief survey of the cultural and physical geography of the three countries. Part A also includes an Outline of History, in chart form, an Outline of Art History, and so-called Practical Information, i.e., Traveling Season, What to See, Suggested Tours, Car Transport and Hire, and so forth.

Part B consists of the descriptions of 15 Road Routes connecting all of the principal cities of the Benelux nations. These routes are described in the usual Baedeker style and with the famous attention to detail. Mileage, elevation above sea level, and what the author considers to be the important sights in each town and village are listed. Three maps, each at a scale of 1:500,000 and showing a part of one of the three countries, are included in this section.

Part C is a Gazetteer of the Chief Towns and Tourist Resorts. The major towns and cities are described, usually with a short history. Museums, churches, and famous buildings, along with other tourist attractions, are all mentioned. Plans or sketch maps are given for 18 towns.

Part D lists the hotels, inns, and restaurants. Size of the hotels, prices, and, infrequently, a comment on quality are included. The guidebook concludes with an index and a folded map in color of the entire area at a scale of 1:1,000,000.

The Autoguides depart from the format of the older Baedekers. They are both wider and longer, measuring 5″ by 8¾″. The binding and cover are in the familiar red color, although now of plastic.

DAVID A. SMITH

*The Pennsylvania State University*

*Frequencies and Durations of Hourly Temperatures, Fort Greely, Big Delta, Alaska.* F. DE PERCIN AND O. S. PARMELE. Technical Report EP-122. Quartermaster Research and Engineering Center, Environmental Protection Research Division. Natick, Massachusetts. January 1960. iv and 19 pp. illust.

This technical report is the sixth in a series of Quartermaster studies of temperature frequencies and related climatic conditions.

Authored by Fernand de Percin, meteorologist in the Regional Environments Research Branch, and Owen S. Parmele, Statistical Office, the report provides information on frequency and duration of hourly temperatures, by months, for the period July, 1944 through December, 1953. The purpose of the study is to analyze those aspects of temperature in a subarctic environment which are of significance in the testing and training activities of the United States Army.

The report has three major divisions: (1) a climatic summary which includes brief statements on sunshine and radiation, temperature, precipitation, windspeed, and cloudiness; (2) frequencies of low and high temperatures; and (3) duration of temperatures, which includes consecutive hours at minimum values, consecutive days at minimum values, and consecutive days at maximum values.

References to other pertinent works about the area are listed at the end of the study. Future reports are planned which will deal with the frequencies of selected temperature, wind, and cold-wet conditions for other subarctic areas of North America, Europe, and Asia.

JACK R. VILLMOW

*Harvard Russian Center*

*A Geography of Ghana.* E. A. BOATENG. Cambridge University Press, American Branch. New York. 1959. xvi and 205 pp. illust. $4.00.

This publication is a welcome addition to the roster of geography textbooks on Africa. The book is designed primarily for use by pre-university and first-year university students; however, the information which it contains makes it valuable to a much wider, as well as more mature, audience. It is written in a clear and concise style. The terminology employed assumes that the reader has knowledge of the basic principles of physical geography.

*A Geography of Ghana* is divided into three parts. Part I, The Land, treats physical aspects of the country—relief and structure, climate and weather, river systems and lakes, and vegetation and soils. Part II, Human Response, is economic in nature, dealing with the principal occupations of the people of Ghana, population, settlement, communications, and ports. Parts I and II, comprising half of the book, provide a foundation for the remainder. In Part III, Regional Patterns, the author divides the country into 12 geographic regions, each of which is discussed in some detail.

Forty-nine maps, a number of which are sectional, aid the reader in visualizing the geographic patterns of the country. Other line drawings in the book include a number of cross-sections and graphs. Forty-one excellent and well-reproduced half-tones conclude the text. Illustrated are such items as plant associations, characteristic landscapes, various facets of economic activities, and transportation facilities.

The world's growing interest in Africa should commend this book to all geographers, regardless of whether their special fields of interest include the continent of Africa.

P.R.C.

*The Indian Journals: 1859-62.* LEWIS HENRY MORGAN. LESLIE A. WHITE, ed. The University of Michigan Press. Ann Arbor, Michigan. 1959. xii and 233 pp. illust. $17.50.

Lewis Henry Morgan (1818-1881), one of the founders of American social anthropology, recognized the fundamental difference in the laws of kinship used by certain Indian tribes, as contrasted with the European-American system. In pursuit of his investigations of the extent and implications of these differences, and of other Indian customs, he made four successive annual visits to the West: two to Kansas and Nebraska, May and June 1859 and 1860; one to Pembina and Fort Garry on the Red River of the North, July and August 1861; and one up the Missouri River as far as Fort Benton, May to July 1862. The publication of the journals and notes of these field trips is the occasion for this book.

The material in these journals of immediate interest to the geographer is somewhat less than might be expected, but there are ecological and physiographical observations that are rewarding. Morgan was a product

of a forest culture area, and he looked upon the prairie and grassland West from that perspective. But, primarily, he was preoccupied with his quest for information about kinship systems, and other Indian customs. Some material that might be of importance to the geographer was omitted by the editor, the topics involved being indicated in brackets. For example, p. 149, above Fort Randall: "a few pages of topographical notes 'Bluffs and Bottoms'; and some notes on how to cook camas root, obtained from Father De Smet . . ." ——— p. 151: "a few pages on the Beaver and on 'Timber in Iowa' . . ."——————— and p. 157: a description of the Cannon Ball River Buttes. Most Indian vocabularies were omitted. Morgan did not distinguish clearly between the immigrant tribes relocated under the Indian removal policy developed between 1825 and 1830, and the so-called native tribes, some of whom had also been recently relocated. The editor has not remedied this deficiency. On his first two trips, Morgan dealt only with immigrant and recently relocated tribes.

In the second chapter, the editor undertook to provide an historical background for Morgan's visits to Kansas and Nebraska. Obviously, Mr. White was not sufficiently acquainted with the historical literature of the area. Historical errors occur also in the notes to the journals. Space does not permit enumerations and corrections.

The illustrations were selected and edited by Clyde C. Walton. Of the 16 full-page color plates, two are by George Catlin, seven by Karl Bodmer, four by James Otto Lewis, and three by Charles Bird King. In addition, there are over 100 black and white illustrations. Few are illustrations of things mentioned in the journals, but belong to the period. The quality of the reproduction helps to make the book a luxury item, using a three-column page to accommodate the large color plates.

JAMES C. MALIN
*University of Kansas*

*The Perpetual Forest*. W. B. COLLINS. J. B. Lippincott Co. Philadelphia and New York. 1959. 288 pp. $4.50.

This is the intimate story of the tropical rainforest and its denizens, as told by one who has lived and worked in it for 20 years. The author, Deputy Chief Conservator of Forests for the Government of Ghana, makes no pretense at presenting a broad and systematic analysis of the forest. Instead, he selects some of its representative facets and regales the reader with details on the minutiae of such topics as the death of a single tree, the story of the termite, the seed of the forest, protective coloration, man and the forest, the honey guide bird, animal and insect migrations, the driver ant and his forays, the chemistry of photosynthesis, and a hundred other like items.

*The Perpetual Forest* is not a scientific book in the strict sense of the word; it is popularized science. Yet, it is chock full of scientific information – and scientific mysteries, as well. It will serve as an invaluable source for any geographer who wishes to imbibe vicariously the sights, sounds, smells, and feelings of the still mysterious rainforest.

G.F.D.

*The Third World War*. HARRY WELTON. Philosophical Library, Inc. New York. 1959. 330 pp. $6.00.

This book, subtitled Trade and Industry – The New Battleground, presents a comprehensive survey of the world-wide economic offensive which is being conducted by the Soviet bloc against the non-Communist countries of the world. "The Third World War is already in progress," Mr. Welton writes. "The weapons are marketable commodities. . . . The main armies are not soldiers but salesmen." Drawing from a wide range of published material, the author effectively demonstrates the many facets of the expanding economic contest.

Much of the book concentrates on industrial sabotage by the Communists since World War II, particularly among dockworkers and in the British motor car industry. Considerable attention is also paid to the nature of Soviet propaganda in the Western world, especially through such organizations as the World Federation of Trade Unions and the World Peace Council. Mr. Welton has done considerable research in the propaganda field and presents in detail such items as the germ warfare propaganda campaign during the Korean con-

flict (a conflict which he terms "a calculated attack on the economies of the western Powers") and of the various Peace Congresses of the World Peace Council.

Some of the most valuable material in the book for geographers deals with the economic expansion of the Soviet Union and its Eastern European satellites into non-Communist areas, with particular attention paid to the Middle East. A comprehensive table of Soviet orbit trade agreements with seven under-developed countries is presented in the Appendix. Although the table covers only the period through 1957, it shows clearly the outlines of Soviet policy which have more recently been in evidence in Soviet dealings with such countries as Cuba and Brazil.

LEWIS M. ALEXANDER
*Kent State University*

*Readings in Military Geography.* Reference Book RB 20-4, U.S. Army Command and General Staff College. Fort Leavenworth, Kansas. 1959. i and 317 pp. illust. Not available for public distribution.

It is difficult to formulate an accurate definition of the term military geography, and the contents of this book reflect such difficulty. If a reader construes military geography as a study of the locational aspects of wars and battles, and is concerned with the geographic background of strategy and tactics, he is likely to be disappointed in this book. Indeed, the volume is properly titled only if the phrase military geography is defined as any geographic information which might be of interest to the military.

The book is an anthology of geographical writings, evidently aimed to help a student officer acquire a minimum geographic background. Although all of the chapters are topical as opposed to regional, and although more are concerned with political geography than with any other topic, the selections range over a wide variety of subjects, including meteorology, cartography, population, and economic geography. Most of the material is designed for students with no previous geographic training; seven of the 17 substantive chapters are extracts from standard geographic textbooks. Even so, there is a considerable range in the degree of sophistication of the other chapters, which vary between Stephen B. Jones' mature and amply documented "Global Strategic Views" to Frank J. Taylor's "The Jet Stream is the Villain," reprinted from *Popular Mechanics* and *Reader's Digest.*

In the reviewer's opinion, the book's miscellaneous contents would make it difficult to use as a text for a course in political geography. Its main purpose, as indicated on the title page, is a reference book, and an instructor might find it useful as a source of selected outside readings for an introductory course.

PEIRCE F. LEWIS
*The Pennsylvania State University*

*Atlas of the Northern Frontier of India.* Ministry of External Affairs, Government of India. Manager of Publications. Delhi, India. 1960. 39 maps. Rupees 15.00 or 23 s 6 d.

Because of the Sino-Indian boundary problem, this atlas is most timely. It brings together authentic reproductions of maps pertaining to the northern frontier of India, and claims to contain "a representative collection of maps from which it will be clear that the northern frontier of India, as shown on official Indian maps, is the traditional boundary between India and China. Official and unofficial Indian, Chinese, British, French and German maps have been showing this boundary alignment for many years past."

The atlas is divided into four sections, viz., Section I: general (9 maps), Section II: maps showing the boundary in the Ladakh sector (8 maps), Section III: maps showing the boundary in the Assam sector (10 maps), and Section IV: variations in Chinese maps from 1928 onwards (12 maps).

Among the general maps in Section I is a *Postal Map of China* published by the government of China, Peking, in 1917 showing all the northern boundary of India more or less according to the traditional Indian alignment. Another map, of Tibet, based on the *Atlas of the Chinese Empire* published by China Inland Mission (1908), shows the Indian boundary in agreement with the traditional boundary.

Section II mostly includes 18th and 19th century British, German, and Chinese maps. Two of these are reproductions of maps prepared by Captain Henry Strachey "from his own surveys and other materials" in March, 1851, which show the boundary in the Ladakh area just as it is on modern maps of India. Other maps in this section showing the traditional boundary between India and China in the Ladakh area are *Central Asia* by John Arrowsmith (1876), *Central Asien* by Dr. Joseph Chavanne (Leipzig: 1880), and "Tibet: West Section" from the *China Postal Album* published by the government of China, Peking, in 1919.

Details of the North East Frontier of India as agreed upon at the Simla Convention, 1914, and known as the McMahon Line, are brought out in two maps of Section III. At the Simla Convention, the British representative initialed the map whereas the Chinese and Tibetan representatives signed in respective scripts "in token of our acceptance, this 27th day of April 1914." Another map, attached to Article 9 of the Simla Convention, bears the signatures and official seals of the British and Tibetan representatives. These signed maps are clear proof of Chinese acceptance of the McMahon Line as the boundary between India and China.

The final section of the atlas contains maps of Chinese origin showing departures from the traditional boundary since 1928. The inconsistent representation of the boundary in Chinese sources is evident from these maps. The recent trend, however, has been to push the boundary deeper into Indian territory.

SHYAM S. BHATIA
*University of Delhi*

*Tukani*. HELMUT SICK. R. H. STEVENS, translator. Eriksson-Taplinger. New York. 1960. 250 pp. illust. $5.00.

This is a very unusual kind of book. Most accounts of exploring expeditions are filled with nonsense or with trivial matters of no interest to students. But this one is not nonsense, and it is not trivial.

Helmut Sick was the naturalist attached to an expedition under the auspices of the *Fundacao Brasil Central* that traveled from Aragarcas on the Rio Araguaia to the lower Rio Tapajos. The purposes of the seven-year expedition were to open hitherto unknown country to settlement, and to locate a string of air bases and emergency landing fields along the line of flight between Rio de Janeiro and Manaus.

Sick was commissioned to make botanical and zoological collections, but especially to observe the behavior of the native animals in their natural surroundings. His descriptions of the remote *campo cerrado*, habitat of the Chavante Indians, and of the virgin *selva*, will rate among the most vivid and scientifically accurate of any that have ever been written. His amazing adventures with the exuberant plant life, and with the incredible animals that live in the forest in constant competition with each other, are told with a kind of modest eloquence that is fascinating. You can almost feel the countless stings of the insects, and you want to flee before the advancing armies of warrior ants. Yet it is told by a writer whose love of natural things eliminates all thought of revulsion or fear. His feeling for the essential dignity of man, even savage man, is much needed in the modern world filled with hatred and race bias.

The reviewer is quite ready to question the advantage of clearing these forests, eliminating their untamed savages, and bringing in a wave of settlement. Rather, he wishes to lend his support to those urging the government of Brazil to establish here a Central Brazil National Park.

PRESTON E. JAMES
*Syracuse University*

*The Lost Cities of Africa*. BASIL DAVIDSON. Little, Brown and Co. Boston. 1959. xiii and 366 pp. illust. $6.50.

Some books are over-ambitiously titled. This one is conservatively named, for it deals not only with the ancient urban centers of Africa but also with the civilizations that spawned those cities. In reality, the author presents, for the first time in print, a resume of the development of human culture in the so-called Dark Continent from its earliest known existence until approximately the beginning of the colonial period. The treatment is popular; the archeological and anthropological background required of

the reader is negligible; but the story unfolded before the European-biased student of history is astounding. For those interested in pursuing the topic further, and on a more professional level, there is included a comprehensive bibliography of several hundred entries that lists many of the more important contributions in the field.

The materials in this book are not geographic, despite the several maps that are included, the geographical organization of the book's contents, and the occasional references to geographic factors in the evolution of Africa's culture areas. But the book provides essential background information to any geographer having an interest in the continent, and it might well be termed an essential book for the library of a geographer specializing in Africa for nowhere else, to the reviewer's knowledge, can there be found a summation of the present status of information and conjecture about the early history of Africa's peoples.

G.F.D.

*Atlas of 300mb Wind Characteristics for the Northern Hemisphere.* JAMES F. LAHEY, REID A. BRYSON, HAROLD A. CORZINE, AND CHARLES W. HUTCHINS. University of Wisconsin Press. Madison. 1960. 127 unnumbered pp. $4.00.

This excellently illustrated document is the result of research sponsored by the Geophysics Research Directorate of the Air Force Cambridge Research Center, Air Research and Development Command. It is truly an atlas; only one page is devoted to discussion of the data used, how used, and the charts.

One hundred fifty-two charts, the last eight of which describe a harmonic analysis of the annual height variations, are included. All are centered on the North Pole.

The charts are arranged by months, each month being represented by the following 12 map types: resultant geostrophic winds; mean west-east component of the geostrophic wind; standard deviation of the daily value of the west-east component of the geostrophic wind; mean north-south component of the geostrophic wind; standard deviation of the daily value of the north-south component of the geostrophic wind; mean height of the 300mb surface; standard deviation of the daily value of the 300mb height; mean temperature at the 300mb level; and four maps on one page – total momentum flux, eddy motion momentum flux, steady motion momentum flux, mean kinetic energy.

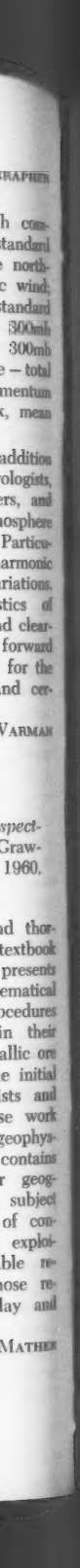
The atlas is a welcome scholarly addition to the information sought by meteorologists, climatologists, physicists, geographers, and all others who recognize the atmosphere as a huge thermodynamic engine. Particularly thought provoking are the harmonic analyses of the annual height variations. The three-dimensional characteristics of the so-called air-ball are skillfully and clearly portrayed. One will surely look forward to other publications of this nature for the job is complete, well conceived, and certainly timely.

HENRY J. WARMAN

*Clark University*

*Introduction to Geophysical Prospecting.* MILTON B. DOBRIN. McGraw-Hill Book Co., Inc. New York. 1960. ix and 446 pp. illust. $9.50.

This is a completely revised and thoroughly up-to-date edition of a textbook originally published in 1952. It presents a well-organized resume in nonmathematical form of the many principles and procedures currently used by geophysicists in their search for oil or gas pools and metallic ore deposits. Primarily intended for the initial training of professional geophysicists and for continuing use by those whose work involves securing or interpreting geophysical data, this book nevertheless contains much background information for geographers. Knowledge of the book's subject matter will sharpen the thinking of conservationists concerned with wise exploitation of the earth's nonrenewable resources and relations between those resources and human activities, today and tomorrow.

KIRTLEY F. MATHER

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